Omnia.11

Stereo FM Audio Processor

Installation and Operation Manual
July 2011

Applicable to:
Software Version 1.03r300 and Higher

Omnia
A Telos Company

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President’s Note: Welcome to Omnia.11!

Cleveland, Ohio
September, 2010

If you love Rock-and-Roll there's a good chance you'll understand the following scenario. Consider how daunting it must have been for the Beatles to follow-up "Sgt. Pepper," or what the next concept was in Pete Townshend's mind after the worldwide acclaim of "Tommy." Personally, I always wonder how Bruce Springsteen contemplates his next project after the completion of many of his masterpieces.

Well processing gang, seems I now understand the predicament! Your overwhelming acceptance of Omnia processors parallels the above scenarios for all of those artists. OK, so maybe there won't be a "processing rock opera", but the popularity of Omnia, as made by you, has put it in rock-star status among broadcastings elite! Humbly....I wish to thank each and every one of you for your dedication and support.

Now, Omnia embarks upon the next phase - or tour - of this wonderful journey. You know, Mr. Springsteen said it perfectly, "One day, we'll look back on this, and it will all seem funny." He’s right, as I look back on all this, it's been - and remains - an amazing ride!

Now it's time for us to offer you our follow-up as we present Omnia.11. A lot of anticipation awaits Omnia.11, and our goal was to climb the charts again, with a bullet. By now you're heard or read all of the stuff from the marketing gang. So I'll spare those details. But it is important to note that aside from the effort undertaken to create Omnia.11, there's a tremendous team who deserve recognition for this product. As said in other communiqués, Omnia isn't just "Frank" anymore. Now you get to hear and see the results of that statement. Omnia.11 resides on a whole new firmware platform, which incorporates both DSP and an industrial grade quad-core PC. I believe this is a first in the processing realm. In order to do this, the Omnia team worked extremely hard to assemble a platform that is powerful, flexible, and ready for the future. It's my view that our platform design and firmware selection will create possibilities the 'other' guys are still dreaming about. So in addition to a great sounding processor, you also possess a device that is designed for the ever changing technical landscape we find in broadcasting today.

To that extent, Rob Dye, Bill Mohat, Ed Zmuginsky, Corny Gould, and Mark Manolio are to thank for their creativity. Additionally, there are quite a number of end-users who shared their ideas with us, and we're extremely grateful for the input from everyone.

I've always felt that competitive quality sound is what ultimately sells a processor, not the number of bands or the latest whimsical features we see offered by others. In Malcom Gladwell's book "Outliers," he details numerous stories about how various people reached their level of success. The short form answer is that it takes close to 10,000 hours of work or practice to reach this lofty goal. Pretty insightful stuff! I have no doubt that my algorithmic running mates Rob Dye and Cornelius Gould have long surpassed this milestone. Their efforts, input and insight to the algorithms in Omnia.11 are worth a book unto themselves. Ask Corny about the multitude of hours we spent in our development lab going over algorithm performance and breaking down the barriers to achieve increased performance in what is today Omnia.11.

Hopefully by now you can draw your own conclusion as to which company has not only become the world's leading broadcast processing developer, but also whom all others look to clone. We chuckle when our tech concepts show up in product descriptions of other companies.

In closing, I want to Thank You, once again for your support in us. As you get rolling with Omnia.11, please know we are there 24/7 should you need assistance. As always, we'd love to know your feedback, so please feel free to share. As a friend in the live steam hobby told me about his business, "If you like the product, tell others. If you don't, then tell me."

Rock on!

Frank Foti
President, Omnia Audio

Omnia.11 Quick-Start Setup Guide

We know that you're probably in a hurry to begin using your new Omnia.11. If you have technical expertise and previous knowledge of audio processor fundamentals, using our 2-page Quick-Start Setup Guide below will get you up and running as quickly as possible.

Please refer to the illustrations and user interface overview below to become familiar with the location of the various controls and connectors associated with the installation, and then follow the steps on the next page to proceed with the installation.

Front Panel User Interface Overview:

Touch the **Icon buttons** near the top of the screen to select the section of the processor to view and adjust.

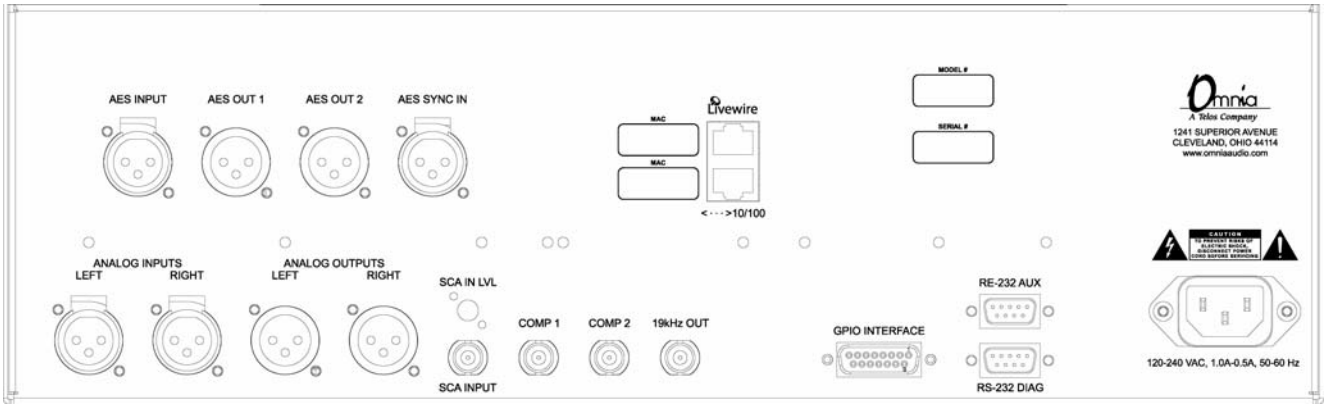
At the top of both the **Metering Area** and the **Menu Area** are tabs that organize the meters and controls into smaller groups. Touch the tab for the desired group to bring up the meters and controls for that group.

Additionally, any sub-groups of controls in a tab (if any) are indicated by small buttons on the left side of the **Menu Area**. Touch the desired button to bring up the controls in that sub-group.

To select a variable control in the **Menu Area** for adjustment, touch it to select it (it will be highlighted in an alternate color when selected) then rotate the **Jog Wheel** to adjust it in real time. No additional confirmation touch is needed. Note: The Jog Wheel's push switch is not yet implemented.

The state of On/Off controls can be changed either by rotating the **Jog Wheel** (counter-clockwise for off and clockwise for on) or by touching the left or right half of the control as appropriate. Touching the left half of the control will turn it off and touching the right half of the control will turn it on.

Drop-Down controls (controls that have more than 2 selections in a drop-down list) are changed by first touching the control to display the list and then touching the desired selection from the list.



1. The Omnia.11 is a large unit so it would be advisable to have the help of an assistant when installing it in the rack. Pull outward on the outside of each handle until you hear a click and they both securely lock into place. Using the handles, install the Omnia.11 in the equipment rack using all four rack screws. Once secured to the rack, slide the release pin (located on the back of each handle at the top) toward you and fold the rack handles back to their normal position.

2. Connect AC power to the unit (there is no power switch!)

3. Connect the audio inputs that are appropriate for your installation. The Omnia.11 accepts balanced professional line-level analog audio or AES/EBU digital audio on standard XLR connectors. If you have an existing Livewire system, the single Livewire Ethernet connection is all that is needed for audio I/O (except for the composite MPX outputs).

4. Touch the **"Input"** icon button near the top-left of the screen to bring up the Input menu and metering. If the **"Basic"** tab is not selected, touch it to select it. From the **"Input Source"** drop-down, select the **Analog, AES/EBU** or **Livewire** input as appropriate for your installation. If your audio source is providing an audio feed you should then see meter activity on the bargraph meters.

5. While driving the inputs with typical program material at normal operating level, adjust the appropriate **"Master"** Input Gain control until the peak-reading input bargraph meters are peaking just "into the yellow" (about –15 to –12 dBFS or so). If the left/right audio levels coming into the Omnia.11 are somewhat unbalanced, you can adjust the **"Right Trim"** control to adjust the level of the right channel alone over a limited range.

6. Connect the outputs that are appropriate for your installation.

7. Touch the **"Output"** icon button at the top-right of the screen to bring up the Output menu and metering. If the **"Basic"** tab is not selected, touch it to select it. Touch the **"FM Options"** button on the left side of the Menu Area and ensure that the **Pre-Emphasis**, **De-emphasis** and **BS-412** settings are correct for your system and your location. The de-emphasis only affects the XLR and Livewire outputs and can be set on/off individually for each output. The composite MPX outputs are never de-emphasized. All outputs are active simultaneously.

8. Now touch the appropriate button above the **"FM Options"** button to select the group of output controls you will be using. Adjust the appropriate control so that the output level is correct for the equipment that follows the Omnia.11. For access to the composite MPX stereo generator controls, touch the **"Composite"** button.

9. Touch the **"FM"** icon button then touch the **"Preset"** tab to display the list of factory processing presets. Touch the preset you would like to start with to select and activate it. Note: The same processing **"Preset"** tab is also available in the **Wide Band**, **AGC or Limiters** menus as well as the **FM** menu.

   We strongly suggest listening to all the factory presets, regardless of their name, to get a feel for their differences. For each one, be sure to adjust the clipper **"Drive"** control here in the **"FM"** menu as low as possible for the loudness needed. This controls the primary loudness vs. distortion tradeoff.

The Omnia.11 Quick-Start Setup is now complete. Please read the rest of the User Manual to learn about some of the features that make the Omnia.11 unique, for additional details on proper installation and for full details on the operation and adjustment of every control function.

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SAFETY INSTRUCTIONS

1. Read All Instructions. **All safety and operating instructions must be read before operating the product.**

2. Retain All Instructions. **All safety and operating instructions must be retained for future reference.**

3. Heed All Warnings. **All warnings on the product and those listed in the operating instructions must be adhered to.**

4. Follow All Instructions. **All operating and product usage instructions must be followed.**

5. Heat. **This product must be situated away from any heat sources such as radiators, heat registers, stoves, or other products (including power amplifiers) that produce heat.**

6. Ventilation. **Slots and openings in the product are provided for ventilation. They ensure reliable operations of the product, keeping it from overheating. These openings must not be blocked nor covered during operation. This product should not be placed into a rack unless proper ventilation is provided through following the manufacturer's installation procedures.**

7. Water and Moisture. **Do not use this product near water – for example; near a bath tub, wash bowl, kitchen sink or laundry tub; in a wet basement; or near a swimming pool or the like.**

8. Attachments. **Do not use any attachments not recommended by the product manufacturer as they may cause hazards.**

9. Power Sources. **This product must be operated from the type of power source indicated on the marking label and in the installation instructions. If you are not sure of the type of power supplied to your facility, consult your local power company.**

10. Grounding and Polarization. **This product is equipped with a polarized AC plug with integral safety ground pin. Do not defeat the safety ground in any manner.**

11. Power Cord Protection. **Power supply cords must be routed so that they are not likely to be walked on nor pinched by items placed upon or against them. Pay particular attention to the cords at AC wall plugs and convenience receptacles, and at the point where the cord connects to the product.**

12. Lightning. **For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the AC wall outlet. This will prevent damage to the product due to lightning and power supply surges.**

13. Overloading. **Do not overload AC wall outlets, extension cords, or integral convenience outlets as this can result in a fire or electric shock hazard.**

14. Object and Liquid Entry. **Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind into the product.**

15. Accessories. **Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious damage to a child or adult, and serious damage to the product. Any mounting of the product needs to follow manufacturer's installation recommendations.**

16. A Product and Cart Combination **should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and the cart combination to overturn.**

17. Servicing. **Refer all servicing of the product to qualified service personnel.**

18. Damage Requiring Service. **Unplug this product from the AC wall outlet and refer servicing to qualified service personnel under the following conditions:**

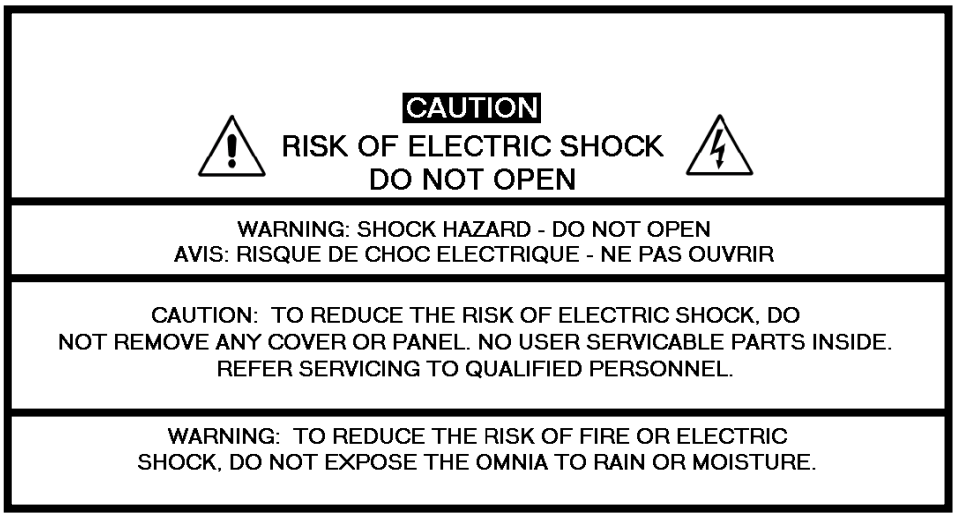
- **When the AC plug is damaged.**
- **If liquid has been spilled or objects have fallen into the equipment.**
- **If the product has been exposed to rain or moisture.**
- **If the product does not operate normally (following operating instructions).**
- **If the product has been dropped or damaged in any way.**
- **When the product exhibits a distinct change in performance. This indicates a need for service.**

19. Replacement Parts. **When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or that have the same characteristics as the original parts. Unauthorized substitutions may result in fire, electric shock, or other hazards.**

20. Safety Check. **Upon completion of any repairs to this product, ask the service technician to perform safety checks to determine that the product is in safe operating condition.**

21. Cleaning. **Do not use liquid cleaners or aerosol cleaners. Use only a damp cloth for cleaning.**

HAZARD / WARNING LABELS


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
WARNING: SHOCK HAZARD - DO NOT OPEN
AVIS: RISQUE DE CHOC ELECTRIQUE - NE PAS OUVRIR
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO
NOT REMOVE ANY COVER OR PANEL. NO USER SERVICABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED PERSONNEL.
WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC
SHOCK, DO NOT EXPOSE THE OMNIA TO RAIN OR MOISTURE.

The **Exclamation Point** symbol, within an equilateral triangle, alerts the user to the presence of important operating and maintenance (servicing) instructions in product literature and instruction manuals.

The Lightning Flash with Arrowhead symbol, within an equilateral triangle, alerts the user to the presence of non-insulated dangerous voltages within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

WARNING -- This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions in this manual it may cause interference to radio communications. The device has been formally submitted for testing and found to comply with the limits for a Class B computing device (pursuant to subpart J of Part 15 FCC Rules) and has been designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, and the user and at his expense will be required to take any measures required to correct interference.

CANADA WARNING – This digital apparatus does not exceed the Class B limits for radio noise emissions set out in the Radio Interference Regulations of the Canadian Department of Communications. Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limits applicables aux brouillage radioelectrique edicte par le ministere des Communications de Canada.

CE CONFORMANCE – This device complies with the requirements of the EEC Council Directives: 93/68/EEC (CE Marking); 73/23/EEC (Safety – low voltage directive); 89/336/EEC (electromagnetic compatibility). Conformity is declared to those standards: EN50081-1, EN50082-1.

LITHIUM BATTERY CAUTION – There is a danger of explosion if the internal battery is replaced incorrectly or shorted. Replace the battery only with same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

USE OF SHIELDED CABLING – In order to conform to the CE requirements for High Frequency radiation, shielded cables must be used for all audio and data connections.

NOTE: When the unit is operated in an extremely high RF environment, it may be helpful to connect cable shields to the XLR-connector terminal that connects cable shield to chassis ground, not to pin 1. Additionally, a 0.01uF capacitor connected between XLR pin-1 and the chassis terminal may be helpful in some instances.

RoHS COMPLIANCE – The RoHS Directive stands for "the restriction of the use of certain hazardous substances in electrical and electronic equipment". This Directive bans the placing on the European market of new electrical and electronic equipment containing more than agreed levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants. Omnia.11 FM is in compliance with the EU RoHS Directive.

Manual Update Notification

Audio Processing – a unique art form that we take very seriously!

As part of our dedication to the science of audio processing we will continue to improve and update the Omnia product and its documentation based on our ongoing research, real-world field experience, and the valued input from our many thousands of loyal customers.

We strongly encourage our customers to visit our Omnia website for product enhancement announcements, software updates, updated user manuals, and customer support bulletins.

The following URLs have been included for your convenience:

Manual Updates	http://omniaaudio.com/manuals
Frequently Asked Questions (FAQ)	http://omniaaudio.com/faqs
Tech Tips & Support Bulletins	http://omniaaudio.com/tips
Software Upgrades & Remote Software	http://omniaaudio.com/software
White Papers & Technical Discussions	http://omniaaudio.com/white-papers

Chapter-1: Installation

Pre-Installation Tasks

Please take a few minutes to read through this chapter before proceeding with the installation of your new Omnia.11 processor.

About This Manual

The latest version of this manual is always available for download from the Omnia website here:
http://omniaaudio.com/manuals

Omnia.11 Components

By now, you've unpacked the shipping carton to gain access to this manual. Now is the time to inspect the Omnia.11 unit and its shipping carton for any signs of shipping damage. Such damage must be reported to your carrier for any claims. The Omnia.11 shipping box includes the following components:

- Omnia.11 processor.
- Omnia.11 Operating Manual.
- Warranty Registration Card. (Please complete the form and return/FAX it to Telos/Omnia)
- Two IEC Power Cords, one of the USA/Canada style, and one of the Euro style.

AC Power Environment

The Omnia.11 subsystem is a DSP-based microcomputer, and therefore requires reasonably clean AC power, just as any modern computer system does. And even though the Omnia.11 power supply is equipped with robust AC transient suppression, we recommend that an "online" style (non-switching type) Uninterruptible Power Supply (UPS) with transient surge suppression be employed.

At transmitter sites there can be heavy transients on the power lines as well as significant surges introduced into the power system by frequent lighting strikes. These are unwelcome power line events and can damage even the most robust equipment. Therefore you should give the AC power environment and installation practices thorough consideration before plugging in the Omnia.11 (or any other microcomputer-based equipment).

A White Paper by one of our Support Engineers can be found on the Telos Systems website at the URL listed below. It details proper grounding and contains links to some surge suppression products for both the power mains and the often-neglected telephone, Ethernet and ISDN line connections that can (and do) conduct powerful surges into the equipment.

http://www.telos-systems.com/techtalk/surge.htm

Installation & Connections

Rack Mounting & Grounding

The Omnia.11 is a large unit so it would be advisable to have the help of an assistant when installing it in the rack.

The Omnia.11 requires four RU (7" [17.78 cm]) of rack space. Pull the outer edge the 2 rack handles towards you until they lock securely. Then and only then rack mount the unit using all four rack screws! No other two-screw mounting arrangement will secure the unit properly or prevent distortion of the front panel!

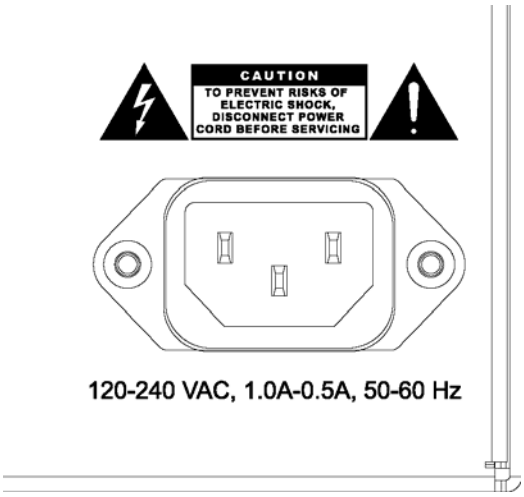
Once secured to the rack, slide the release pin for each rack handle toward you and fold the rack handles back to their normal position

Adequate ventilation should be provided, and although not required, it is always good engineering practice to allow one blank rack space immediately above and below the Omnia, especially if equipment generating significant heat is located below the unit. You may install 1RU (1.75") vented or solid rack panels to fill these spaces.

The processor should be installed into a properly grounded 19" equipment rack.

It is a good idea, especially at transmitter sites, to run a separate ground strap or braid from the Omnia.11's chassis to a solid rack or station ground point. Although no separate ground lug is provided, the end of the strap or braid can be clamped under the Omnia's top cover using the Omnia's existing top cover screws.

AC Mains Power



AC Power Connection

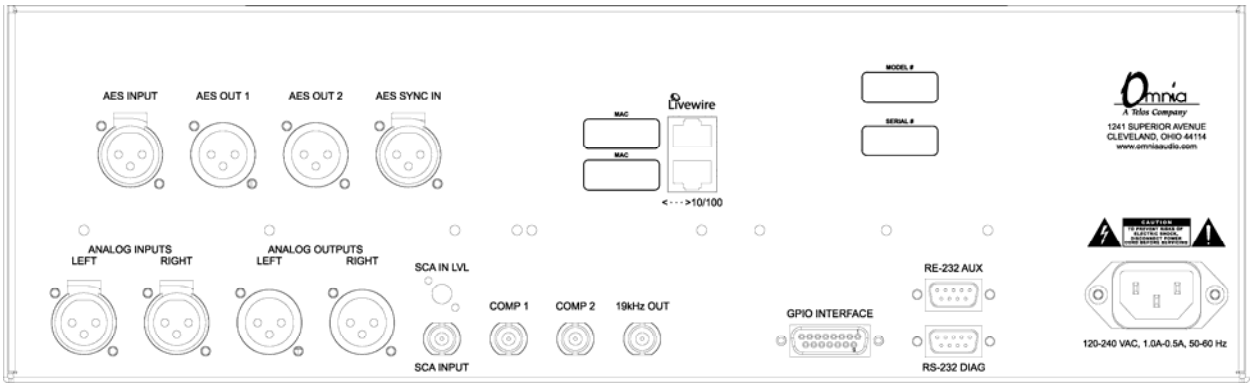
Omnia.11 utilizes an <u>un-switched</u> EMI-filtered IEC power-entry module.

Omnia.11's automatic voltage–sensing, high-efficiency switching power supply allows it to operate on AC mains voltages from 100 to 240 VAC and from source frequencies of either 50 or 60 Hz.

In the USA or Canada, plug the provided IEC type AC power cord into the unit and then into a grounded AC outlet.

Outside of the USA you must use the appropriate power cord that complies with local electrical regulations.

Rear Panel Connections



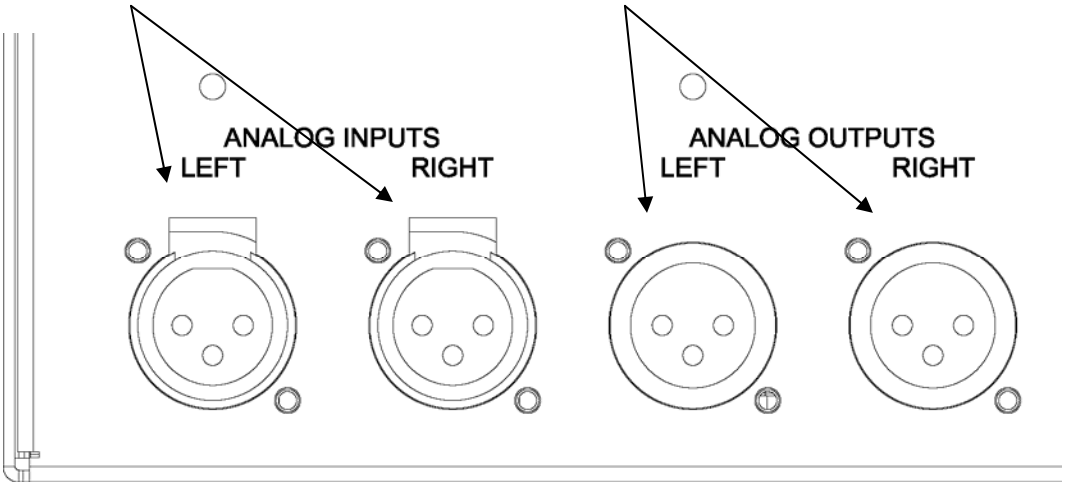
Analog Audio Inputs and Outputs

Balanced XLR-type connectors are provided in the lower left section of the rear panel for the analog audio. Both analog and digital input sources may be connected simultaneously, however, only the input source that has been selected in the menu will be active. Analog/Digital/Livewire input source selection is done through the **"Input Src"** (Input Source) software parameter setting in the **Input** menu.

All outputs are active simultaneously.

The stereo analog inputs are designed for standard +4dBu balanced signals. Pin 2 is Hot.

Individual Left and Right analog outputs are available on two male XLR jacks. Pin 2 is Hot.



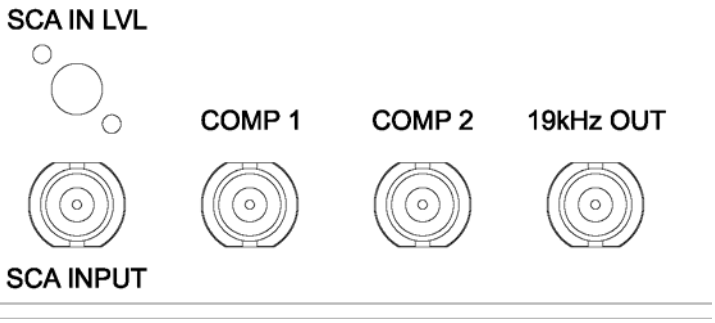
A Note about Relative Phase:

If the relative phase of your installation (including the Omnia.11) differs from that of your existing system, your announcers may feel that they sound "weird" in their headphones. If this occurs, then the relative phase of the processor is 180 degrees from what your air talent is used to. To remedy this, you can either reverse the polarity of both of the analog inputs or simply change the **"Invert"** setting to **[Both]** in the **Input** menu.

Stereo Generator Connections

Four standard female BNC connectors comprise the Omnia.11's stereo generator connections.

There are two composite MPX outputs with independent software level controls, one SCA input with level adjust trimpot and one 19 kHz pilot sync output.



COMP 1 & COMP 2 (Composite Outputs 1 & 2) (BNC)

These two low impedance outputs (Composite 1 and Composite 2) are each capable of driving up to 100 feet of RG-58A/U coax cable. The output levels are individually adjustable so the unit can operate as a "composite DA" to drive a variety of equipment. The output levels and other stereo generator settings are set through software parameters in the **Stereo Generator** submenu of the **Input/Output** menu. An internal jumper sets the output impedance to either 5 ohms (the factory setting) or 75 ohms. The default setting is appropriate for the vast majority of exciter connections. However, in the event that a higher source impedance is required, a jumper can be moved (one for each composite output) on the motherboard to change the source impedance to 75 ohms. For reference, JP10 is for Composite #1, and JP9 is for Composite #2.

19 kHz OUT (Pilot Sync Output) (BNC)

This TTL-level 19 kHz square wave output can be used as the reference signal for most RDS or SCA generators that operate at 57 kHz or other multiple of the 19 kHz pilot frequency. This Sync output is phase and frequency locked to the stereo pilot. When this signal is used to synchronize an external SCA or RDS generator, this locking assures that no difference frequencies exist which may cause intermodulation between the pilot and the SCA signal.

SCA INPUT (BNC)

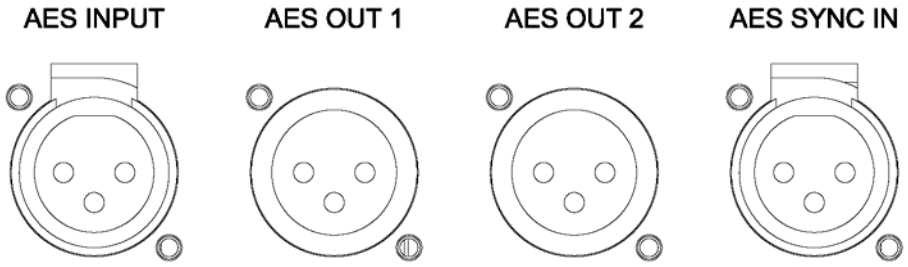
Any SCA or RDS signal above 53 kHz can be added to the composite outputs of the Omnia.11 by connecting the signal to the SCA INPUT connector. The SCA signal is mixed in the analog domain directly into both composite outputs. A high-pass filter on the SCA input provides SCA to main-channel crosstalk protection. The SCA injection level can be adjusted using the **SCA IN LVL** control trimpot. See below for details.

SCA IN LVL (SCA Input Level) (trimpot adjustment)

Located just above the SCA Input BNC jack is the SCA IN LVL (SCA Input Level) adjustment control.

Carefully insert a small bladed screwdriver into the hole and adjust the control if needed to set the SCA injection level.

AES/EBU Digital Input, Outputs & AES/EBU External Sync Input



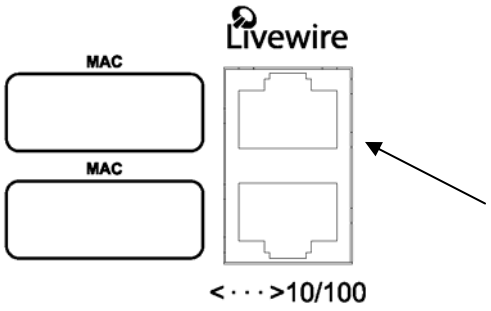
The digital AES/EBU (AES-3) inputs (AES INPUT and AES SYNC IN) use standard balanced 3-pin female XLR connectors. They accept any sampling rate between 32kHz and 96kHz. No user adjustment of the sample rate is necessary on the AES-3 input as a high-quality digital sample rate converter is built in.

There are two AES-3 outputs on standard balanced 3-pin male XLR connectors. These provide either an internally generated output sample rate of 48 kHz or the sample rate can be locked to an external AES/EBU signal applied to the **AES SYNC IN** connector or to the AES/EBU input signal. These options are selectable using the **"Samp. Rate" (Sample Rate)** setting in the **Output** menu.

Note: The analog and digital outputs are active simultaneously.

Ethernet / Livewire Connections

NOTE: Network functionality/Setup is not available with the initial software. It will be made available to you in a future software update.



The RJ-45 10BaseT / 100BaseT Ethernet / Livewire I/O jack can be used simultaneously for both TCP/IP based remote control of your Omnia.11 and audio input/output to your existing Livewire network.

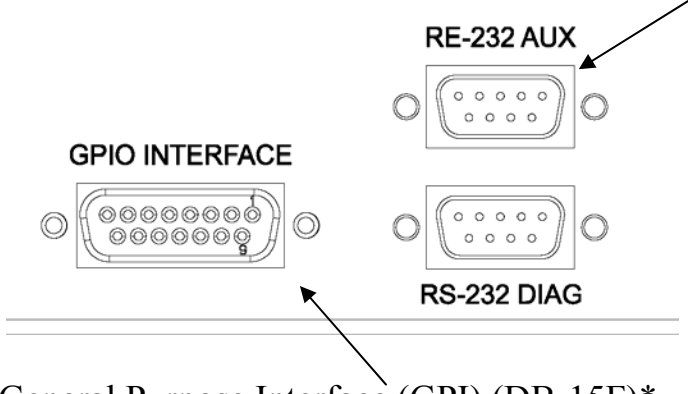
Ethernet 10BaseT/100BaseT Remote and Livewire I/O

RS-232 Serial Port (DB-9M)* Connections

NOTE: RS-232 serial port functionality/Setup is not yet available with the current software. It will be made available to you in a free future software update.

The DB9-male RS-232 AUX connector can be used to

The DB9 Male RS-232 DIAG connector is for diagnostic use with a computer running a terminal program such as Windows Hyperterminal.



[1] The setup and operation of the Omnia's Remote Control capability is covered in detail in **Appendix C**, starting on Page

*Please note that the RS-232 functionality is not yet implemented in the current software but will be available with a free downloadable software update. Please check the Omnia website for new software announcements, download links and manual updates at: http://www.omniaaudio.com/

General Purpose Interface (GPI) (DB-15F)*

NOTE: GPI functionality is not yet available with the current software. It will be made available to you in a free future software update.

This DB15-female connector serves as a four-input, opto-isolated interface to the Omnia's internal Trigger Script functions*. Four of the pins are "trigger" inputs, one is a bias voltage input, one is a +5V power output, and the remaining three are "ground." The trigger inputs can be used to dynamically alter the Omnia.11's operation in response to logic transitions on the interface connection. Virtually any parameter of the Omnia can be controlled using the Trigger Scripts.

The Trigger Script Interface is a standard component of the Omnia.11 Remote Control Interface. Full details, including connector pinout, are covered in **Appendix C**, starting on Page

*Please note that the GPI and Trigger Script functionality are not yet implemented in the current software but will be available with a free downloadable software update. Please check the Omnia website for new software announcements, download links and manual updates at: http://www.omniaaudio.com/

Powering Up

Now you are ready to power up the Omnia.11 for the first time.
Connect AC power to the unit using the appropriate supplied power cable for your location.
(There is no power switch!)

When the Omnia.11 is first powered on, you will see text-based boot status messages followed by some graphics test screens and finally the main screen as shown below.

This main screen will appear "frozen" for a while as the I/O board finishes booting up. This is normal.

Audio will appear at the analog audio outputs approximately 1 minute from power-on. The AES/EBU and Livewire outputs also become usable at this time however full initialization of the digital ports is not complete for several more seconds and a small audio glitch may be heard when the final sample rate converter initialization is complete.

"Input" Screen

You will note that the screen defaults to the adjustment (ADJ) mode with the Input menu and metering displayed.

The Omnia.11 is now ready for configuration and use.

Please proceed to the next chapter to learn how to use the touch screen graphical user interface and how to configure the Omnia.11 for your system.

Chapter-2: Getting To Know Your Omnia.11

The Omnia.11 User Interface

Now that your Omnia.11 is rack-mounted, connected to a program audio source, and turned on, you're ready to learn how to operate it! This chapter covers the front panel touch screen user interface, your window into the Omnia.11 processor.

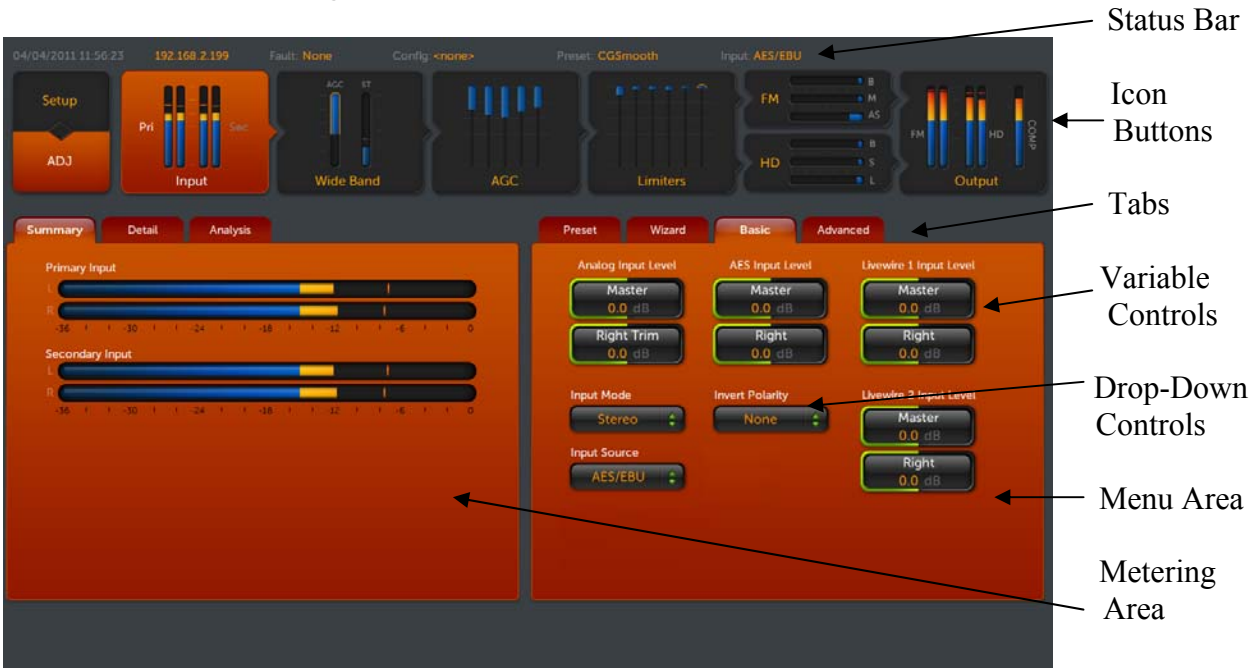
The large front panel full-color LCD touch screen along with a jog-wheel, make up the primary Omnia.11 User Interface:

Omnia.11 Key Front Panel Features

Headphone Level Control

A standard ¼" TRS stereo headphone jack is located at the left side of the front panel and allows the processed audio signal to be monitored. The Headphone volume level control is physically located to the right of the headphone jack. The headphone amplifier itself is a high-headroom design and is driven by its own high quality D/A converter that is independent of the analog XLR outputs. Therefore level changes in either output will not affect the other.

Icon buttons, Metering Area and Menu Area



Input Screen

The top row of the Omnia.11's screen contains a **Status Bar**. The status bar shows the current date & time, the unit's IP address, fault status, currently selected I/O configuration (if any), currently selected processing preset and the currently selected input.

Just below the status bar are 9 **Icon Buttons**: Setup, ADJ, Input, Wide Band, AGC, Limiters, FM, HD and Output. These are touch screen buttons that are always present and allow you to switch between the various metering/menu screens below them. Some of the icon buttons conveniently contain mini-sized working meters that represent their full-sized metering area countertypes.

Below the icon buttons are the Metering Area to the left and the Menu Area to the right. The metering area contains full-sized versions of the meters in the icon buttons and the menu area contains the controls used for adjustment. In the default Input screen, the two horizontal bargraph meters show digital sample-accurate peak representations of the left and right channel input levels for both the primary and secondary inputs. The **Primary Input** meter corresponds to the input selected with the **Input Source** control in the menu area and the **Secondary Input** meter corresponds to the **Failover Source**. **NOTE: The Input Failover feature is not yet available with the current software. It will be made available to you in a free future software update.**

Let's go over setting your primary **Input Source** and adjusting the **Input Level** for that source now.

We will begin with an overview of the user interface.

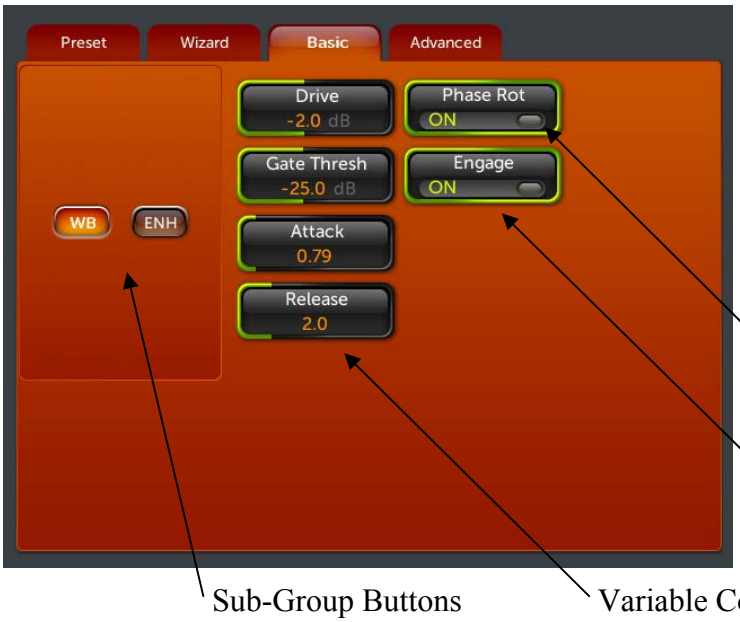
User Interface Overview:

At the top of both the **Metering Area** and the **Menu Area** are **Tabs** that organize the meters and controls into smaller groups. Touch the tab for the desired group to bring up the meters and controls for that group.

Additionally, sub-groups of controls in a tab (if any) are indicated by small **Sub-Group Buttons** on the left side of the **Menu Area**. Touch the desired button to bring up the controls in that sub-group.

There are 3 styles of controls: **Variable** controls, **Off/On** switches and **Drop-Down** list controls. Examples of Variable and Drop-Down controls can be seen in the Input screen picture above while Off/On switches, Sub-Group Buttons and Variable Controls can be seen in the Wide Band AGC menu area picture on the next page.
To select a **Variable Control** in the **Menu Area** for adjustment, touch it to select it (it will be highlighted in an alternate color when selected) then rotate the **Jog Wheel** to adjust it in real time. No additional confirmation touch is needed.

Note: The Jog Wheel's push switch is not yet implemented.



The state of **Off/On** switches (see picture at left of the Wide Band AGC Basic menu area) can be changed either by touching the control over the gray indicator (so as not to change its state) to highlight it and rotating the **Jog Wheel** (counter-clockwise for off and clockwise for on) or simply by touching the left or right half of the control over the "ON" or "OFF" text. Touching the left half of the control will turn it off and touching the right half of the control will turn it on.

Drop-Down controls (controls that have more than 2 selections in a drop-down list) are changed by first touching the control to display the list and then touching the desired selection from the list.

User Interface Tutorial – Input Source Selection and Peak Input Level Setting

The following exercise is a useful introduction to the user interface. Start from the Input metering/menu screen (as displayed when the unit is first turned on).

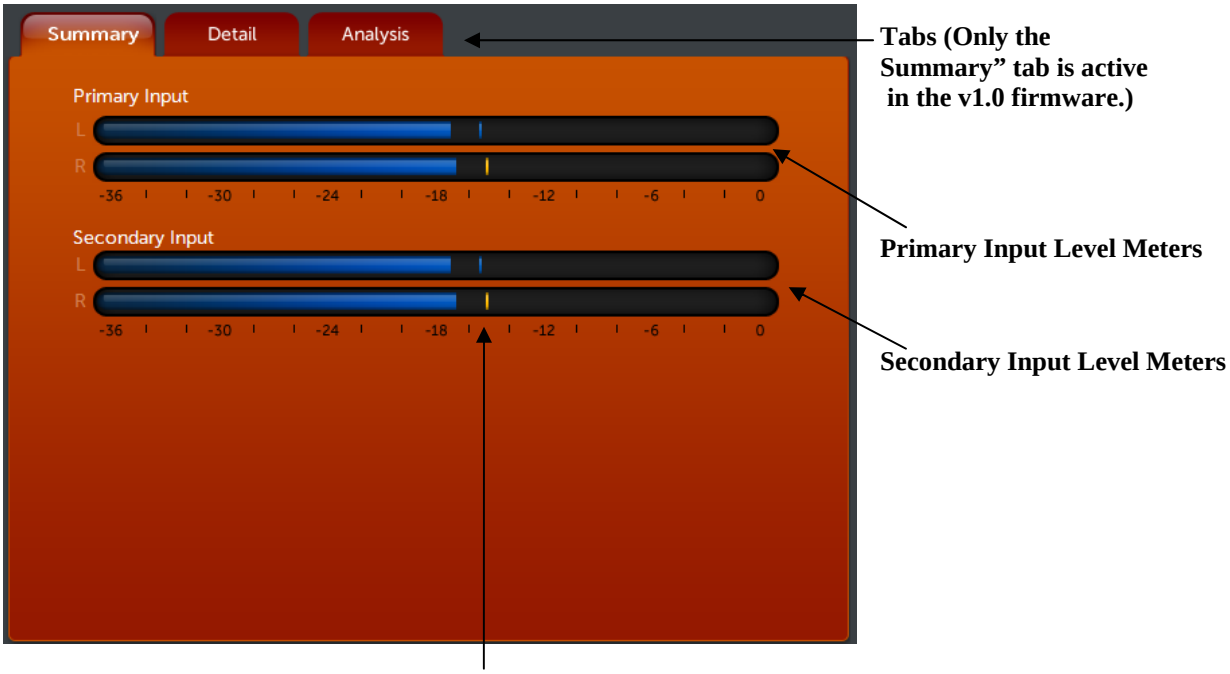
If the Input metering/menu screen is not being displayed, touch the **ADJ** icon button in the upper-left corner of the screen and then the "Input" icon button to display it.

- Touch the control in the Menu area labeled **Input Source** to bring up the drop-down list of possible input sources.
- Analog is the default input source. The other choices are AES/EBU digital, Livewire 1 and Livewire 2. Touch the desired input source name to select it. (Note that the current selection will be highlighted white-on-gray in the list. Even if you will be using the analog inputs, try selecting another input and then switch back to Analog. If you do not wish to change the current selection, simply touch anywhere outside the control in a blank area of the screen to close the drop-down..
- Now touch the **Master** input level variable control for the input you just selected above.
- Rotate the jog wheel clockwise to increase the input level. Rotate the jog-wheel counter-clockwise to decrease the input level. This control adjusts both channels together in precise 0.5 dB steps. The gain in dB is shown inside the control with the previous setting enclosed in brackets [ ].

- Watch the (L)eft and (R)ight channel **Primary Input** horizontal bargraph meters in the Metering Area while adjusting per the following section.

Proper Setting of Input Levels

With normal program audio levels applied, (For analog boards this would be "0dB" or "0VU" on the console's meters and for digital boards this would be when the metering on the Omnia.11 is matching what your digital console is showing on its metering.) a correct input level setting will result in the **Peak Indicators** on the horizontal L & R bargraph meters regularly reaching between -18 and –12 dBFS or a little higher (just "into the yellow"). This gain setting corresponds to system peak headroom of about 12-18 dB. You may adjust the input level slightly lower for more headroom if you wish. Setting the input level for higher meter indications (less headroom) is strongly discouraged unless there is another level-control device prior to the Omnia.11 that will keep the input levels from reaching the maximum digital level of 0 dBFS. During normal operation, you should never see the red "0" segments light.



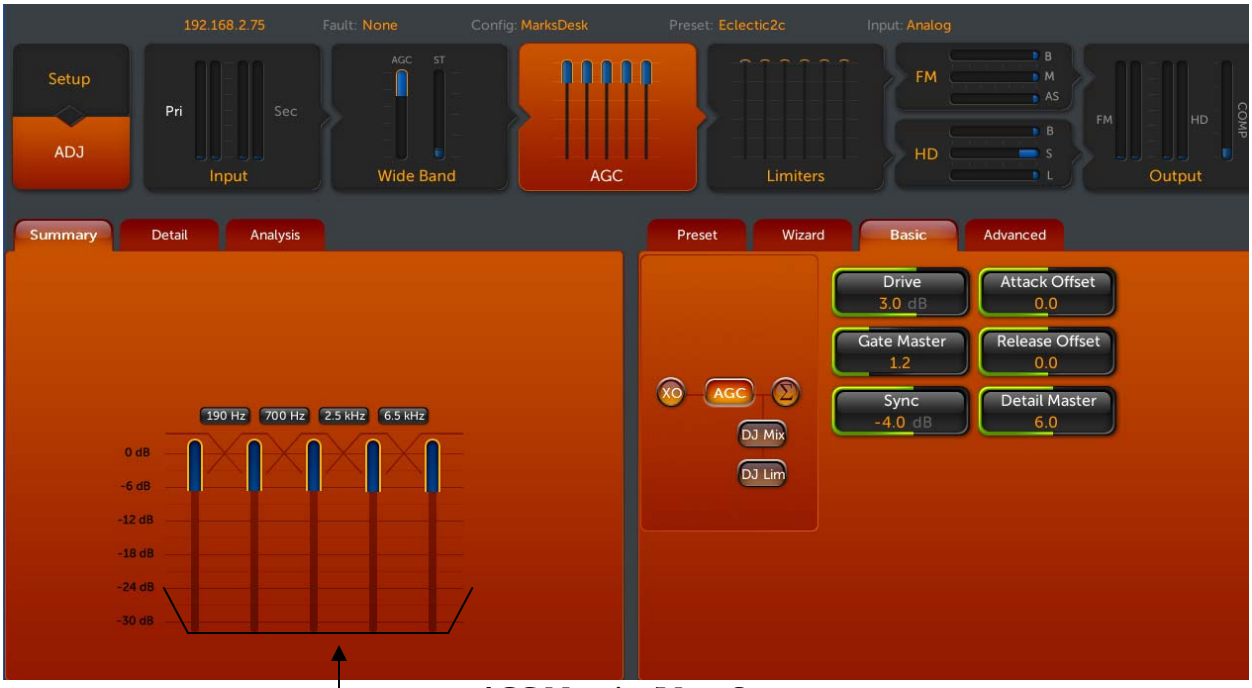
- Once the desired Input level setting is reached there is nothing more that needs to be done. You may touch anywhere on a blank area of the screen to de-select the control if you wish to avoid any accidental operation of the control.

- If the input source's audio is not well balanced you can touch to highlight and adjust the **Right Trim** control located just below the **Master** you just adjusted. This will adjust the right channel's gain only over a range of + or – 3dB relative to the gain setting of the left channel.

All of the Omnia.11's variable controls and Off/On switches are set in a similar fashion by using the touch screen to highlight the control to be adjusted, then rotating the jog-wheel to adjust the control. All drop-down list controls are adjusted with the touch screen only. **Note:** Altering any processing or gain parameter will instantly be reflected in a change in the Omnia.11's output characteristics because all adjustments occur in real time. Therefore any adjustments you make will be instantly heard as they occur.

Processing Activity Metering (Gain-Reduction Meters)

Touch the **AGC** icon button to bring up the multi-band AGC metering/menu screen:



AGC Metering/Menu Screen

AGC Gain-Reduction Meters

The AGC gain-reduction meters in the metering area show the activity of the 5 AGC (automatic gain control) processing bands within the Omnia.11.

The leftmost meter shows the activity in the LO (low) band followed by the ML (mid-low), MH (mid-high), HI (high) and SH (super-high) bands. The Low bands control the bass part of the audio spectrum, the Mid bands the midrange and the Hi bands the treble. The 4 currently selected crossover frequencies are also shown near the top of and between the bargraphs.

The amount of gain-reduction occurring in each band is indicated by a solid blue bar that drops downward from the top.

Gating (gain-freezing) of each band is indicated by a bright yellow outline around the blue bar.

The gain-reduction of the AGCs recover to a resting gain setting which coincides with the RTP (Return to Platform) levels set for each band.

The AGC meters operate relatively slowly since the AGC's job is to control overall levels and to provide a gentle dynamic EQ to moderate compression effect, preparing the audio for the peak controlling sections that follow.

The limiter meters operate faster because they work on the peaks in the audio signal.

All of the details regarding the AGC and Limiter sections are covered in Chapter 5.

Chapter-3: Setting Up for Your System

Setup Mode

There are 3 setup/configuration screens in Setup mode: **Network**, **Livewire** and **System** configuration. The currently running system software version can also be found in the **System** icon button.

Touch the **Setup** icon button icon in the upper-left corner of the screen to enter Setup mode.

Network Parameter Setup

You should see the following Network configuration screen. If not, touch the ***Network*** icon button to display it.

The Network setup screen is where you set up the Omnia.11's network parameters for remote control and/or Livewire use. **NOTE:** A reboot will be required after changing any of the network parameters.

Available parameters are:

IP (IP Address)

Accepts data in the form of four octets to describe the Ipv4 network address assigned to the Omnia.11's network interface. The entries have the form of:

[octet] . [octet] . [octet] . [octet] which when entered may appear as a network address such as:

192.168.0.200

Subnet (Subnet Mask)

Accepts data in the form of four octets to describe the Ipv4 network subnet mask of the Omnia.11's network interface. The entries have the form of:

[octet] . [octet] . [octet] . [octet] which when entered may appear as a network address such as:

255.255.255.0

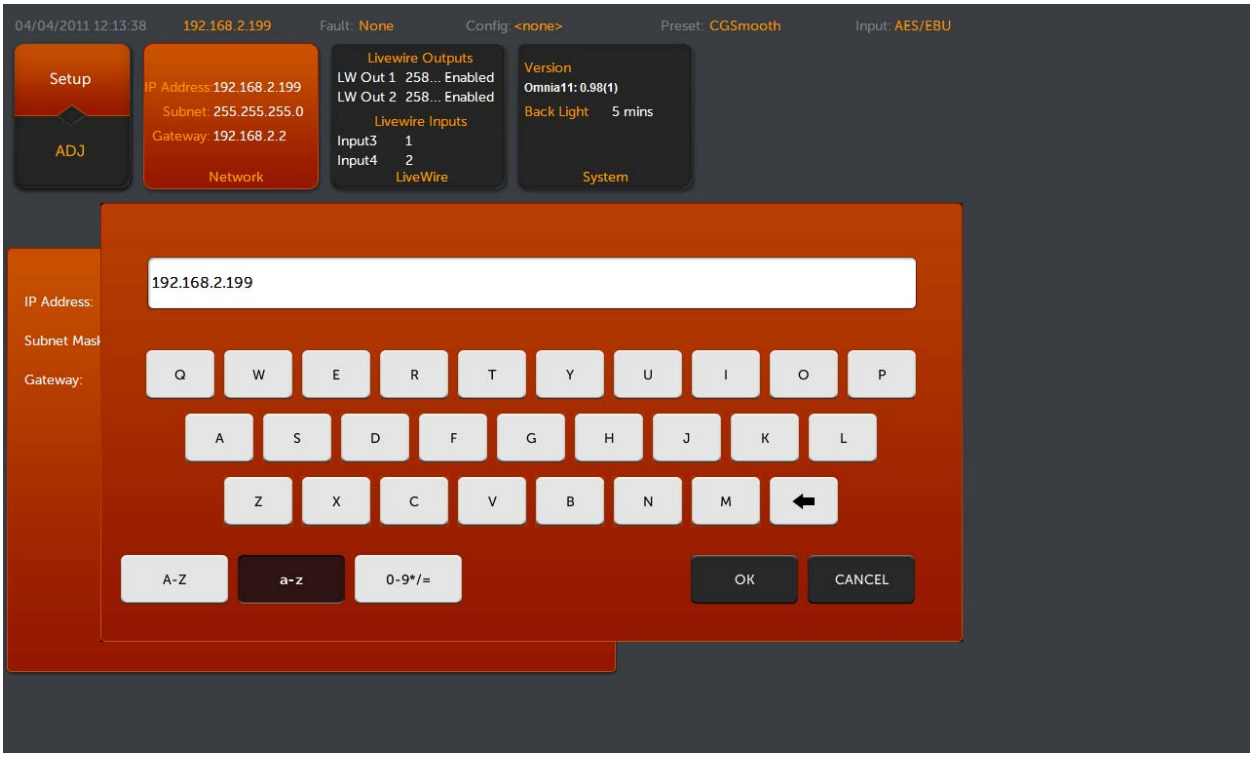
Gateway

Accepts data in the form of four octets to describe the Ipv4 gateway address assigned to the Omnia.11's network interface. The entries have the form of:

[octet] . [octet] . [octet] . [octet] which when entered may appear as a network address such as:

192.168.0.1

To change a setting, touch anywhere inside the white box for the setting you wish to change and the on-screen keyboard will pop-up:



Use the on-screen keyboard to type in the desired addresses. You should only need the number entry mode of the keyboard that should be selected by default for entering the network addresses. If not, touch the **0-9*/=** button.

Touch just to the right of the current entry at the top of the keyboard to place the cursor at the end of the entry.

From this position, the backspace key can be used to delete the desired number of characters or the entire entry. Note that there is only a backspace key and no Delete key.

Once you have the new entry completed as desired, touch the **OK** key. To cancel without making any changes, touch the **CANCEL** key.

Livewire© Setup

Touch the **Livewire** icon button to bring up the Livewire setup screen:

Here you can select Livewire channels and name the available Livewire inputs and outputs.

There are 2 stereo Livewire output channels and 2 stereo Livewire input channels available.

Entries are changed as in the Network setup screen by touching the white box to bring up the on-screen keyboard.

Be sure to touch the **Apply** button after making your changes or they will not take effect.

For more information on Livewire, please consult the documentation that came with your Axia or other Livewire gear.

If you do not have a Livewire system and need to use the network interface for remote control, make sure that the 2 Livewire output channels are disabled. If the 2 **Enable** squares are green, touch them to make the squares white and the Livewire outputs will be disabled.

When finished, touch the **ADJ** icon button to return to the main metering/menu interface.

System Setup

Touch the **System** icon button to bring up the System setup screen

Here you can select the timeout duration for the LCD backlight and calibrate the touch screen.

Backlight timeout choices are 5, 10 or 15 minutes (of inactivity).

To calibrate the touch screen, touch the **Calibrate** button and follow the on-screen instructions.

You will be asked to touch the center of a target in 9 screen positions. When done, click the **Accept** button in the lower left corner of the screen.

Input/Output Configuration and Metering

It is of the utmost importance that the Omnia.11 be properly configured for the system that it will be used in. This will ensure optimum performance of the entire system, maximum quality and loudness over the air.

Input Configuration

All Input configuration settings can be found in the **Basic** tab on the **Input** screen.

If not there already, touch the **Input** icon button to display the Input screen and then touch the **Basic** tab in the Menu area if it is not already selected.

This is where you choose your input source, set input levels, input mode and overall polarity.

If you have not done so already, the instructions for properly setting the input levels can be found in Chapter 2 on Page 12. Input levels can be adjusted separately for Analog, AES/EBU and Livewire inputs.

The **Input Mode** drop-down control allows you to select from Stereo (the default setting), Mono L (routes the left channel input signal to both the left and right processing channels), Mono R (same as Mono L but uses the right channel input signal), Mono L+R (sums the left and right input channels to mono and applies the summed signal to both channels) and Swap (Stereo but with the left and right channels reversed)

The **Input Polarity** drop-down control allows you to change the polarity of the input audio in several ways. **Both** is typically selected if it sounds "better" to an announcer (monitoring themselves in headphones using the output of the processing) than **None**. One of the two settings should. The goal is to make the relative phase of the headphone feed more in phase with the announcer's hearing of his or her own bone conduction. Once set, this setting should remain the same for all announcers using the same headphone feed.

Using the **L** setting, only the left channel phase is inverted and using the **R** setting, only the right channel phase is inverted. **NOTE:** These settings are present as a convenience to correct 180-degree stereo phase errors in the input audio to the processor or in another device after the processor.

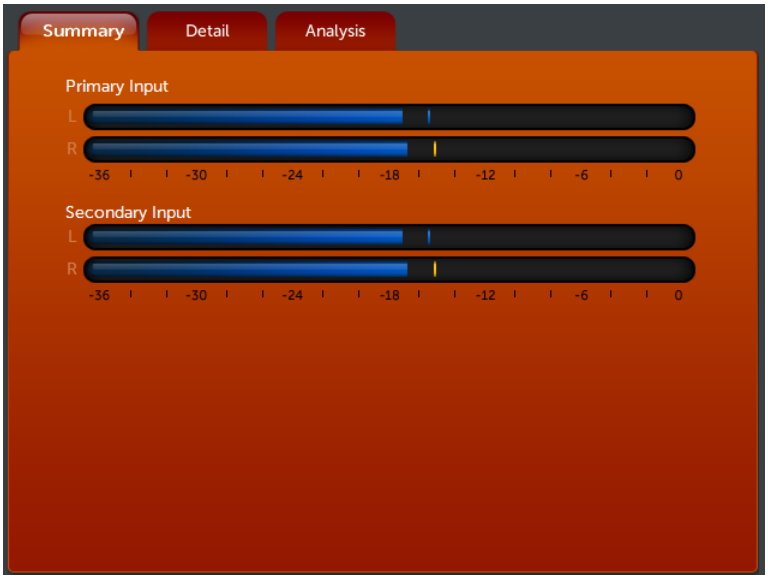
You can choose from among 4 possible stereo input sources for both the primary and secondary sources: Analog, AES/EBU Digital, Livewire 1 and Livewire 2.

The Primary input source is set using the **Input Source** drop-down control.

The Failover Source feature is not yet available with the current software. It will be made available to you in a free future software update.

Input Metering

There are 2 horizontal stereo input meters in the Summary tab: (Note: the Detail and Analysis tabs are not yet implemented here)



Input Metering Screen (Summary Tab)

Primary Input shows the real-time peak input level of the input selected with the **Input Source** control in the menu area.

Secondary Input will show the real-time peak input level of the input selected as the **Failover Source** once that feature becomes available in a free future software update.

Please see the **Proper Setting of Input Levels** section on Page 12 for full details on the setting of the input levels.

Output Configuration

All Output configuration settings can be found in the **Basic** tab on the **Output** screen.

Output metering can be found in both the Summary and Detail tabs. (See **Output Metering** below)

There are 6 selection buttons on the left side of the Menu area.

5 of these group the output controls that are displayed by output type and a 5th button brings up the FM Options menu.

Touch the **Output** icon button to display the Input screen and then touch the **Basic** tab in the Menu area if it is not already selected. The controls will be described by group below.

Analog

There are 4 controls in the **Analog Output Level** group:

Analog Output Submenu (Basic Tab)

Master controls the output level of both the left & right channel analog XLR jacks simultaneously.

Right Trim controls the level of the right channel only over a limited + or – 3dB range to correct left/right balance issues in the following equipment. This is normally set to "0.0 dB".

De-Emphasis controls whether the analog XLR outputs (when set to **FM**) are de-emphasized (ON) or not (OFF).

Output Selection selects the processing channel assigned to the analog output XLR jacks: **FM, HD** or **DJ.**

AES/EBU

There are 4 similar controls in each of the **AES Output 1 Level** and **AES Output 2 Level** groups:

AES/EBU Output Submenu (Basic Tab)

Master controls the AES/EBU digital output level of both the left & right channels simultaneously. **Note:** The Master control in the "AES Output 1 Level" group controls the output from the AES out 1 XLR jack only. Similarly, the Master control in the "AES Output 2 Level" group controls the output from the AES out 2 XLR jack only

Right Trim controls the level of the right channel only over a limited + or – 3dB range to correct left/right balance issues in the following equipment. This is normally set to "0.0 dB".

De-Emphasis controls whether the appropriate **AES OUT** XLR output (when set to **FM**) is de-emphasized (ON) or not (OFF).

Output Selection selects the processing channel assigned to that output: **FM, HD** or **DJ.**

AES 1 Sample Rate: These drop-down controls select the sample rate for each of the 2 AES/EBU XLR outputs. Possible settings are **48k** (internal 48 kHz clock), **Input** (syncs to the sample rate on the AES/EBU input jack) or **External** (syncs to the sample rate of an AES/EBU signal applied to the External Sync XLR input jack on the rear panel).

AES 2 Sample Rate: These drop-down controls select the sample rate for each of the 2 AES/EBU XLR outputs. Possible settings are **44.1k** (internal 44.1 kHz clock), **48k** (internal 48 kHz clock) or **External** (syncs to the sample rate of an AES/EBU signal applied to the External Sync XLR input jack on the rear panel). Sync to **Input** is not available for AES 2. If you have AES 1 synced to Input and you also need AES 2 synced to the same source, you will need to bridge the AES 1 output into the External Sync input and set AES 2 Sample Rate to External.

Livewire

There are 4 similar controls each in the **Livewire 1 Level** and **Livewire 2 Level** groups:

Livewire Output Submenu (Basic Tab)

Master controls the Livewire digital output level of both the left & right channels simultaneously. **Note:** The Master control in the "Livewire 1 Level" group controls the output from the Livewire 1 channel configured in the Livewire Setup screen. Similarly, the Master control in the "Livewire 2 Level" group controls the output from the Livewire 2 channel configured in the Livewire Setup screen.

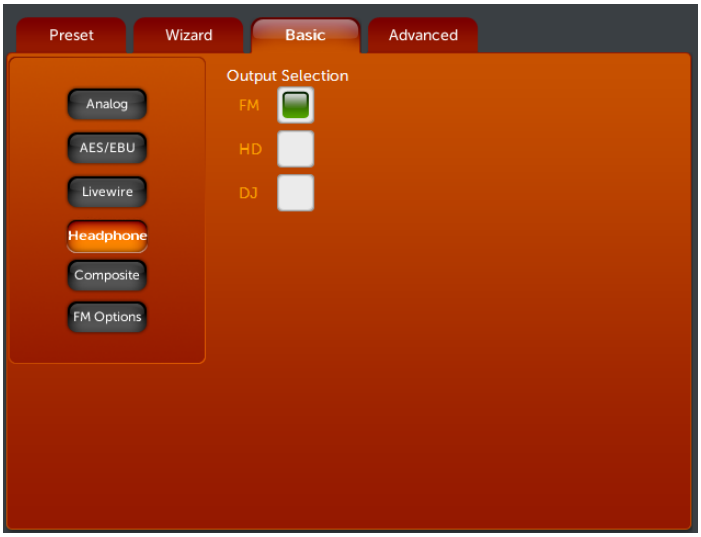
Right Trim controls the level of the right channel only over a limited + or – 3dB range to correct left/right balance issues in the following equipment. This is normally set to "0.0 dB".

De-Emphasis controls whether the appropriate Livewire output (when set to **FM**) is de-emphasized (ON) or not (OFF).

Output Selection selects the processing channel assigned to that output: **FM, HD** or **DJ.**

Headphone

There is but a single control available here: **Output Selection** selects the processing channel assigned to the front panel headphone jack: **FM, HD** or **DJ.**



Headphone Output Submenu (Basic Tab)

Composite

Composite Output Submenu (Basic Tab)

The stereo MPX generator output levels from both of the composite output BNC jacks can be adjusted separately using the **Output 1** and **Output 2** variable controls in the **Composite Level** group over a range of 0 to 10 volts in precise 0.05v increments.

NOTE: Always use typical program material and a calibrated modulation monitor to properly set modulation. To aid quick adjustment, it sometimes helps to advance the **Clipper Drive** control before adjusting the composite outputs. Note that reference line-up tones applied at the Omnia's input cannot be used since the RMS level of a steady state tone does not *crest* at 100% modulation.

Pilot Level sets the 19kHz pilot injection level up to 12.0%, in 0.1% steps, relative to 100% modulation. To defeat the pilot, simply adjust the Pilot Injection control to "0.0" and the pilot will be off.

Pilot Phase This parameter sets the phase relationship between the 19 kHz pilot and the 38 kHz suppressed carrier. The system default is 0.0 degrees. The performance of the DSP based digital stereo generator is theoretically perfect, however should the phase need adjustment in order to offset time domain errors in the overall transmission system, the pilot phase can be adjusted ±32º, in 1º increments. We recommend that a calibrated modulation monitor be used for this adjustment.

Stereo Separation The stereo "sound field" can be reduced by 3 dB or 6 dB to suppress processing-induced multipath that can occur in certain terrain and within certain transmission systems when heavy processing is used. When a setting of **-3 dB** or **-6 dB** is used, the amount of L-R (perceived stereo effect) is also reduced. However in difficult RF signal coverage areas, the amount of perceived multipath is reduced as well, resulting in the perception of a much cleaner overall signal with better penetration and coverage. The Omnia.11 defaults to a setting of **Stereo**, using the full L-R signal for maximum separation. We suggest that you leave it in that mode, but the other settings are available for those who wish to experiment, including a setting of full **Mono.**

Sideband Mode The normal setting for the stereo generator is the **DSB** setting which provides the full double-sideband, suppressed carrier L-R signal.

The special **SSB** setting provides a single-sideband, suppressed carrier L-R signal that can help reduce multipath and provide increased protection to the baseband spectrum. Please check with your local regulatory agency before using this mode since it has not been standardized as of this writing.

For more information please see Frank Foti's white paper, available on our website at:

http://www.omniaaudio.com/mpx-ssb-white-paper

FM Options

There are 3 groups of controls here **Pre-Emphasis**, **BS-412** and **Diversity Delay**.

FM Options Submenu (Basic Tab)

Pre-Emphasis For the transmission side of conventional FM broadcasting, some form of high-frequency boost, or pre-emphasis is used. The most commonly used values of pre-emphasis are 50 and 75 µs (microseconds). For North and South America, 75 µs is used. In Europe, Australia and New Zealand, 50 µs is employed. The factory default pre-emphasis setting is *75 µs*. The pre-emphasis selection affects the operation of the audio processing and is applied to the composite, discrete, AES/EBU digital and Livewire **FM** channel outputs. The **HD** channel outputs are never pre-emphasized.

The pre-emphasized signal at the Left/Right Analog XLR, AES/EBU digital and Livewire outputs can be restored to flat, if needed (such as for monitoring), by the **De-Emphasis** control in each of the respective output groups.

There are three choices for pre-emphasis in the drop-down control: **Off**, **50 *µs*** or **75 *µs*.** Be sure to select the pre-emphasis that is correct for your country.

Note: Normally, the "**Off"** selection under the Pre-emphasis options would not be used in conventional FM transmission applications, but is provided in instances where processing of a flat signal is desired. One example would be when preprocessing prior to a satellite uplink in distributed radio networks.

ITU BS-412 Power Limiter

In certain parts of the world, the average multiplex signal power must be controlled to reduce adjacent channel interference. The currently enforced standard falls under the ITU BS-412 regulations. The Omnia.11 FM has a very effective Multiplex Power Limiter that may be enabled to comply with these regulations.

Loudness Loss Warning!

If your country's regulatory agency does not require the use of the ITU BS-412 Multiplex Power Limiter, make certain that the BS-412 "Engage" control is set to "**Off"**, or severe loss of loudness will result! For example, when the ITU BS-412 Power Limiter is switched on and set at 0.0dB, there is approximately a FIVE dB loudness loss over the limiter being switched off!

BS-412 Engage: This control enables (**On**) or disables (**Off**) the BS-412 Power Limiter. The default setting is **Off.**

Threshold: When **On** above, this control sets the average multiplex power from -3.0dB up to 9.0dB (in 0.25dB steps) with respect to the original 0.0dB ITU BS-412 standard.

Diversity Delay

The 3 buttons below the numerical diversity delay time display are used to set the precise diversity delay time (typically used for HD Radio installations) that will be applied to any output that is set to the **FM** channel.

If diversity delay is not used, be sure the numerical display is showing all zeros.

To activate the diversity delay, start by touching the **sec** button and use the jog wheel to set the course delay time in seconds.

Similarly, you can touch the **msec** and **usec** buttons to finely adjust the delay time in milliseconds and microseconds.

SCA IN LVL (Control on Rear Panel)

The SCA input level control is an analog trimpot and does not appear in the menu. This trimpot is located just above the SCA Input BNC jack on the rear panel. A small flat-blade screwdriver will be needed to adjust it.

Signals input to the SCA jack are simply mixed into both composite outputs through the trimpot.

The gain range is from 0.034 (-29dB) to 1.35 (+2.6dB). At the lowest gain setting, you can feed it a 10V SCA signal and get 8.6% injection on a 3.6V composite output setting. At the highest gain setting, you can feed it a 0.25V SCA signal and get 8.6% injection on a 3.6V composite output setting. (The composite + 9% pilot should be 3.6 V p-p in these cases. The SCA adds to this, making the total higher and the SCA 8.6% of the total).

Output Metering

Output Metering Screen (Summary Tab)

Summary Tab

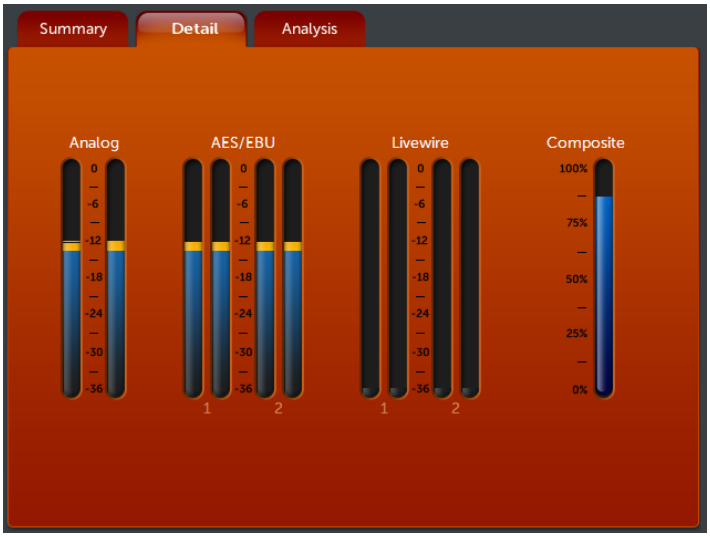
There are 2 stereo output meters in the Summary metering tab:

FM OUTPUT shows the real-time peak output level of the "FM" channel *before* the output level controls referenced to the maximum output level of 0 dBFS. Normally, these meters will be peaking all the way up near 0dBFS when the metered channel is active. These can be used as a quick way to check that the FM output channel is active internally.

HD OUTPUT shows the real-time peak output level of the "HD" channel *before* the output level controls referenced to the maximum output level of 0 dBFS. Normally, these meters will be peaking all the way up near 0dBFS when the metered channel is active. These can be used as a quick way to check that the HD output channel is active internally.

Detail Tab

There are 5 stereo output meters and a composite meter in the Detail tab:



Output Metering Screen (Detail Tab)

The 5 stereo output meters show the real-time peak level of the actual outputs *after* the output level controls in the Menu screen.

Analog Shows the actual peak output level of the Left and Right analog XLR output jacks referenced to a "0" peak level of +22 dBu.

AES/EBU

1 Shows the actual peak output level of the AES 1 XLR output jack referenced to 0 dBFS.

2 Shows the actual peak output level of the AES 2 XLR output jack referenced to 0 dBFS.

Livewire

1 Shows the actual peak output level of the Livewire 1 output referenced to 0 dBFS.

2 Shows the actual peak output level of the Livewire 2 output referenced to 0 dBFS.

Composite Shows the relative peak output of the composite MPX signal from the built-in stereo generator *before* the composite output level controls relative to 100% modulation. Normally, this meter will be peaking all the way up near 100%. This can be used as a quick way to check that the stereo generator output channel is active internally.

Chapter-4: Introduction to Omnia.11 Processing

What you have before you is the result of over three years of intensive research and re-thinking by Team Omnia of what an FM processor should and should NOT be doing to your precious program audio!

Things have changed A LOT in the years since the previous generation of FM processors was designed.

Newer music is often so pre-processed already that the last thing it needs is more processing! Now it's possible for the processor to be "smart" enough to know whether a program element is pre-processed or not and act accordingly. The Omnia.11 is able to do as little further "damage" as possible to already processed content (such as a song from a modern hyper-compressed CD) while acting more aggressively on more dynamic, less pre-processed material.

New technologies have given us ways to design the processor algorithms much more interactively, allowing us to instantly hear the results of changes. This has led to previously unheard of ways to minimize distortion, particularly IM (Intermodulation) distortion, from ALL sections of the processing.

Omnia.11's new algorithms allow the processor to output a much more natural and less-fatiguing sound, WITHOUT losing loudness! And WHILE maintaining your consistent sound "signature". These improvements affect ANY format…as the old saying goes: "From Bach to Rock" and everything in between…and beyond!

The Omnia.11 contains processing for both FM analog stereo transmission and coded audio broadcasts of the same program material, such as the HD-1 digital channel or Internet simulcasts.

Please make sure that you have gone through Chapters 1 through 3 and that the Omnia.11 is installed in the rack and connected to a source of primary program audio before continuing with the rest of this chapter.

The Omnia.11 employs a conventional-looking processing layout (topology) that at first glance appears very similar to our own Omnia-6. But that is where the similarity ends.

Each processing section in the Omnia.11 is much "smarter" than any previous processor so some change in conventional thinking about the adjustment of the processing parameters will be needed on your part if you want to delve in deeply while creating your "signature sound".

But it is also entirely possible that once the Omnia.11 is set up properly for your system and the audio levels are properly adjusted, you will find one of our included processing presets "hits the spot" and no further adjustment will be needed!

So the first thing to do, as alluded to above, is to make sure that all of the Input and Output settings are correct for your system and the levels for your selected inputs and outputs are adjusted properly.

Then it will be time to select a preset to start (or stay) with.

We will go over the basics in this chapter and then Chapter 5 will cover every available control or setting, if needed.

NOTE: You may initially feel that your air sound with Omnia.11 is somewhat "less bright" than with your older processor. Given that the Omnia.11 is set up correctly for your system, this is generally because distortion generated in the old processor was actually creating a "false brightness" to the sound. With Omnia.11 you are actually hearing all of the natural treble that is in the program material on the air, quite possibly for the first time!

Where to Begin?

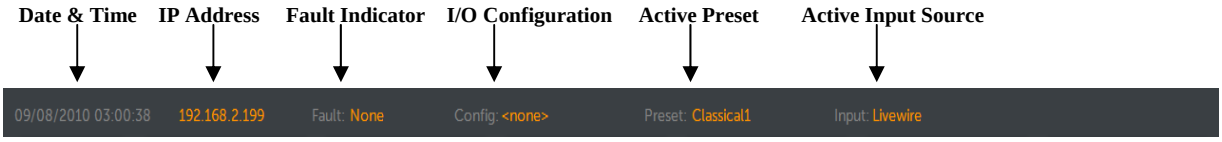
We strongly suggest removing or bypassing any other audio processors in the air chain ahead of Omnia.11.

If you are using a front-end AGC such as the Compellor® ahead of your STL, use it only for overload protection and not with any AGC activity.

These additional AGC devices can conflict with or reduce the effectiveness of the Omnia.11's new highly effective Wideband AGC.

Presets

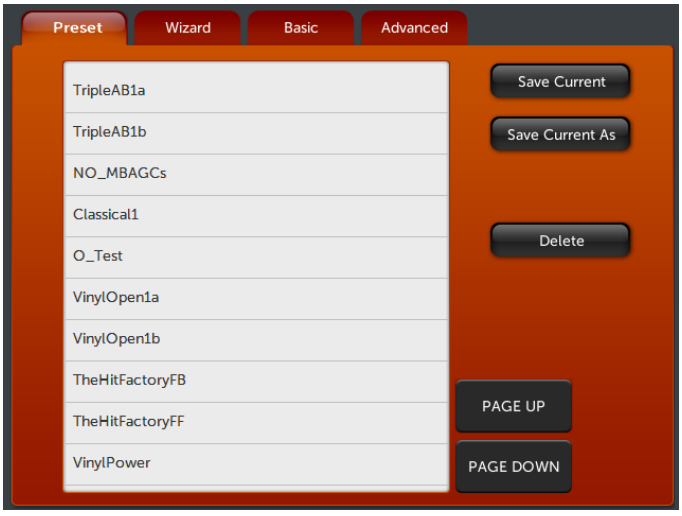
Omnia.11 is equipped with a selection of factory presets that can be used to instantly configure the processing for common applications. The currently loaded preset is displayed in the **Status Bar**, just above the **Limiters** icon button.



Status Bar

Some of the presets have format-based names. Do not take these names too literally! It is entirely possible that you may like a preset named "Oldies" (or like it enough to use it as a starting point) for your Adult Contemporary station.

The best way to begin is to actually try all of the factory presets, accessible from the **Preset** tab in the Menu Area of any **ADJ** mode screen (except Input or Output). Adjust the **CLIP Drive** control for each one as described below. 10 user presets are shown per screen so use the **PAGE UP** and **PAGE DOWN** buttons to see more available presets.



Preset Tab

To instantly put a preset on the air, simply touch its name in the Preset list.

To see more presets, touch the **PAGE UP** or **PAGE DOWN** buttons.

Start by trying the various presets while listening to your typical program material and taking note of their differences.

Then try to decide on one to start with and listen to it on as many different types of radios as you can.

Saving User Presets

Once you have made a change to any parameter, such as the **CLIP Drive** or **Voice Quality** controls discussed below, it is a good idea to save those changes so they will not be lost. The factory presets cannot be over-written so a new user preset must be created. This is done from the **Preset** tab using the **Save Current As** button.

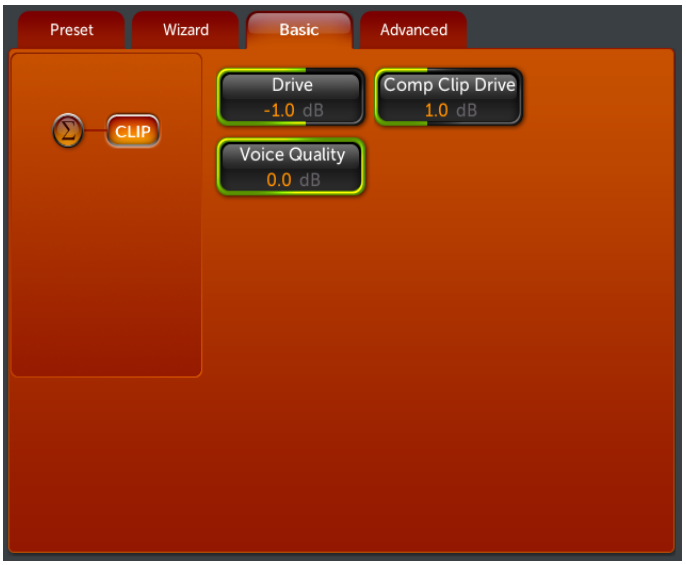
When you touch **Save Current As** the on-screen keyboard will pop-up. Use the on-screen keyboard to type a name for your new preset. While up to 43 characters can be shown for each preset in the preset list window, try to keep the preset names short and descriptive if possible.

If you should want to delete a user preset (factory presets cannot be deleted), touch the **Delete** button and a new window opens containing a list of all of the previously saved user presets. 10 user presets are shown per screen so use the **PAGE UP** and **PAGE DOWN** buttons if needed to see more user presets.

When you make new changes to an existing user preset, touch the **Save Current** button to save the new changes.

CLIP Drive

It is important to adjust the CLIP **Drive** control (Not the "Comp Clip Drive" control) located in the Basic tab of the **FM** menu, (accessed by touching the **FM** Icon button) for each preset that you try.



CLIP Menu (Basic Tab)

Since every air chain and market is different, this control should always be adjusted to as low a setting as possible for the level of loudness needed. You can think of this control as adjusting the primary "loudness vs. distortion" tradeoff.

Try adjusting this control down in 0.5dB steps until the loudness *just* falls off too much, then bring it up a bit from there. That is the correct setting *for you* for the currently selected preset. On some presets, you may need to turn it up instead of down. This is OK too. Adjust it up in the same 0.5db steps until you achieve the loudness required or the sound becomes too distorted, whichever comes first. If the distortion comes first, you probably need to try a different preset.

NOTE: If you are turning up the Clip Drive to increase loudness and you reach a point where the loudness and distortion do not seem to be increasing as you would expect, you have likely run into the **Auto Sense** ceiling. You can navigate to the Advanced Tab and turn down the **Auto Sense** control a little. This will allow more clipping to take place. For more information about clipper Auto Sense, please see Page 47.

Comp Clip Drive (Basic Tab): This controls the drive to the DSP-based composite clipper in the Stereo Generator in dB. A setting of 0.0dB is the same as the clipper being "off ". This clipper operates on the entire baseband signal up to 53 kHz, except for the 19 kHz pilot. No matter how hard you drive the composite clipper, you cannot clip the stereo pilot. Embedded within the composite clipper is a newly designed phase linear low pass filter for superb SCA protection. This filter removes clipping harmonics and prevents them from affecting the SCA and RDS region.

Please use the composite clipper sparingly. We suggest no more than about 0.5dB and you may find that none is needed at all with the Omnia.11!

Chapter-5: Detailed Processing Adjustment

In this chapter, we provide a detailed list of all of the available user controls that can be used to tailor one of the factory presets into a custom use preset for your "signature sound".

Generally, the controls are set up so that increasing any setting will lead to more aggressive processing. For example, a higher drive setting adds more gain into the dynamics section, a higher attack or release setting means a faster time constant (more compressed sound) and a higher gate threshold setting means more gating will occur.

Depending on the type of control adjusted and its range, the changes you make can affect the sound in subtle or extreme ways. Our advice is to make a limited number of changes at a time, make those changes in small increments, and then listen to the results for a period of time before making any further adjustments. Keep in mind that should you get "lost" you can always go back to where you started by simply recalling the factory preset that you started with. The factory presets cannot be overwritten.

Recommended "Tried and True" Adjustment Procedure

1. Make sure that the Omnia.11's Input and Output settings are correct for your system. (See Chapter 3, Page 19: Input & Output Configuration)
2. Once on the air and configured properly for your system, start with a degree of processing that is similar to that currently used by your station (using the preset you selected on Page 30) and then, if desired, become more aggressive. A careful approach is less likely to draw hasty, or even negative, opinions.
3. Be sure to have a clear objective in mind before beginning! Some examples would be 1) to try to increase loudness while maintaining as much quality as possible, 2) to adjust the frequency balance to obtain a certain consistent sound "signature" (more bass, less bass, more mids etc.), 3) to reduce listening fatigue and create a more open, cleaner sound that can be listened to comfortably for longer periods of time..
4. Listen for a while, then adjust, and listen for a while again. Try to avoid the temptation to continuously "fiddle" with adjustments, just moments after getting the system on the air. Remember that you should evaluate the operation over time, not moment to moment!
5. While making changes to the system, we recommend that you do not make hasty or radical changes. Also, do not make too many different adjustments all at once. If too many parameters are changed at one time, it is hard to determine which change made the difference you may hear. That can be frustrating, whether the change made your station sound better or worse. Take your time. In order for you to become comfortable with your new sound, you should learn the limits of each control. We suggest making changes in increments of no more than +0.5 dB or - 1 dB, or in 1 or 2 step increments. Try turning different functions on and off. Working this way, you will be able to get a better feel for the sound that the Omnia.11 is capable of producing on your station and with your programming.
6. Use the "sleep on it method:" Spend time adjusting and then listening, and when the system gets to a point where it sounds good, **stop!** While making changes to processing, there does come a time when the ears become less and less sensitive to the adjustments you're performing. Ears tire, and that's why spreading the adjustment period over a number of days is recommended. If what you've done still sounds good after you have "slept on it," stop adjusting. If you're not quite there yet, continue with small iterations until you're satisfied. If you are homing in on your goals, you'll find that each day the discrepancies become smaller and you're making fewer adjustments.
7. When you get it where you like it, ***stop and enjoy!***

Block Diagram

If you look closely at the Icon Buttons at the top of the Omnia.11's screen, you will see that they form a block diagram or flow chart of the processing path your audio takes through the fully digital, DSP based processing stages within the Omnia.11:

Icon Buttons

The audio starts at the Input section where input sources are selected and levels are set. The audio then goes to the first processing stage, the Wide Band AGC (automatic gain control). Next up is a 5-Band AGC section, a 6-Band peak Limiter section with its own crossover and the final, separate peak control sections for the FM and HD channels. Lastly is the Output section where the channels are routed to their selected output jacks and levels are set.

Wide Band

The Wide Band AGC section is the first processing section the audio "sees" as it passes from the Input section.

The job of the Wide Band AGC is to act as a very smart "hand on the pot", ensuring that quiet intros (for example) do not get "lost" or that loud program sections do not over-drive the following 5-Band AGC section.

Adjustments here can be found in both the **Basic** and **Advanced** tabs and are discussed fully in the next section.

First, a few important notes about the WB AGC in the Omnia.11 since it is different than what has come before:

We designed the AGC with very active programming in mind.

Make sure your input levels on the processor are set properly (per the instructions earlier in this guide) and are hitting up to around -12 dB on the Input Meters when your incoming program levels are normal. (For analog boards this would be "0dB" or "0VU" and for digital boards this would be when the metering on the Omnia.11 is matching what your digital console is showing on its metering).

In other words, with normal program audio playing, if the analog console's meters are bouncing up to 0VU (or the digital console's meters are hitting -12 dB), the Omnia.11's Input meters should show about -12dB. If they are, you're good to go!

As for the AGC, you can drive it very heavily if you want. It won't care. It will not change its sound characteristics no matter how heavily it is being driven (up to -30 dB). In other words there is no "sweet spot" to get the best sound. On the "normal" program levels described above, it should generally average around -9 to -15 dB or so on the WB AGC vertical gain-reduction meter (described in the **Wideband AGC Metering** section below).

Using higher compression ratios (a **Ratio** setting in the **Advanced** tab of 5:1 or higher) will minimize any level variation coming from the studio. The trade-off is a more "closed in" sound when going above 5:1. Some programmers desire this effect for CHR programming, so it's just a matter of programming taste.

Ratios of 3:1 or 4:1 preserve a bit more of the natural dynamics in the source material while still “riding the gain” very well. A ratio of 2:1 is used primarily to provide maximum preservation of dynamic range on very wide dynamic range program material such as Classical.

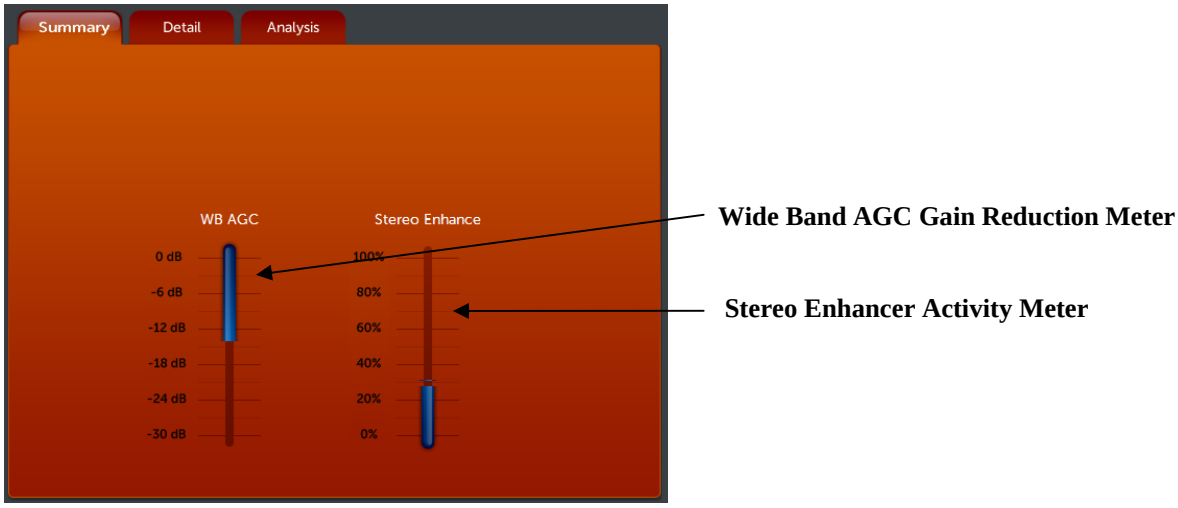
The **Window** function (also in the **Advanced** tab) provides a "dead band" area for the wideband AGC. If you set it at -2 dB, you're telling the wideband AGC that if the source material is within 2 dB of the target level, do nothing. This will allow 2 dB of level variation in the audio, which is nice for keeping the Omnia.11 from over-processing already dense material.

The lower you set the number (say, from -2 dB to -5 dB), the more variation in programming levels you're allowing through...and the more "relaxed" the audio sounds.

Wide Band AGC Metering (Summary Tab)

.The WB AGC meter indicates gain-reduction from the top down in db. The Stereo Enhance meter indicates the amount of activity in the stereo enhancer from the bottom up.

Gating activity is indicated by a bright yellow outline (Gate Indicator) around the blue gain-reduction meter. The gate indicator may show more gating activity than you may be used to in conventional processors, but this is normal.



WB AGC Metering Screen (Summary Tab)

Wide Band AGC (WB) (Basic Tab)

The **Basic** tab here includes not only the adjustments for the WB AGC but also for the Omnia.11’s Bass and Stereo Enhancement functions.

Touch the **WB** button and then the **Basic** tab to access the basic controls for the Wide Band AGC.

There are 4 variable controls and 2 switches located in the WB AGC Basic tab menu area:

WB AGC Menu (Basic Tab)

Drive controls the amount of drive to the WB AGC stage over a + or – 12 dB range. Increasing the drive causes deeper compression to be achieved. This allows quieter passages in the input audio to be raised further than if lesser drive (and less compression) was used. By default, if your input levels are correctly set, there will nominally be about 12-15dB of WB AGC gain reduction with normal "0VU" program audio playing from your console or automation system.

Gate Thresh (Gate Threshold): When the input audio falls below a certain level, the gain control action of the AGC stage is "frozen" by the gate. The level at which this freeze, or hold takes place is controlled by the setting of the Gate Threshold control. Higher settings cause the gate to activate at higher audio levels, causing more overall gating. In most applications this control should be adjusted between about -30dB and -40dB to cause gating action to occur when the input audio falls about that much below nominal. The action of gate also prevents noise rush up during periods of no (or quieter) audio or during pauses in speech.

NOTE: Gating activity is indicated by a bright yellow outline around the blue gain-reduction meter and may show more gating activity than you may be used to on conventional processors. In fact, it may look like the WB AGC is gated most of the time. This is normal! It is due to the Omnia.11's new smart windowed gating algorithms. (see **Window** in the Advanced tab section on the next page for more info)

Don't worry! This WB AGC will intelligently ride gain for you over a wider range with less side-effects than ever before, keeping the following processing sections nicely in the "sweet spot".

Attack: The attack control adjusts how fast the AGC responds to sudden increases in audio level, and higher numbers equate to faster response times. Faster attack times reduce the transient nature of the input audio, while slower attack times improve it. Omnia.11's WB AGC is designed to work effectively with slow attack times. In fact, be careful about using extremely fast attack times because these may cause sudden downward level shifts on peaks during dynamic program material, dulling the natural transient nature of the program material. These peaks are best controlled later in the Omnia.11's Limiter section.

Release: The release control adjusts how fast the AGC recovers from periods of more gain reduction when the input audio levels fall. Faster release times (higher numbers) result in quieter sections of the program material being brought up faster. Try not to set the release too fast though, since that can cause the loss of the program material's natural dynamic "feel".

Phase Rot (Phase Rotator): The phase rotator improves waveform symmetry for program material that is highly asymmetrical in nature. Examples of such programming are the human voice, and sources with non-sinusoidal waveforms such as certain string and wind instruments, as well as certain sounds created by electronic synthesizers. By removing waveform asymmetry from the input program material, cleaner processing results because any limiting that occurs is able to work equally on both positive and negative excursions of the audio waveform. We recommend that this be turned on unless you have phase rotation enabled in your mic processors.

Engage enables (ON) or bypasses (OFF) the WB AGC section.

Wide Band AGC (WB) (Advanced Tab)

Touch the **WB** button and then the **Advanced** tab to display the advanced controls for the Omnia.11's smart Wideband AGC section. There are 4 variable controls and 2 drop-down controls located in the WB AGC Advanced tab menu area:

WB AGC Menu (Advanced Tab)

Window: At a setting of "0.0" the Wideband AGC acts like a "regular" AGC where the gain is always either increasing or decreasing.

Lower settings turn the window function on and open up a "zone" within which the gain can rest and actually do nothing!

When the window setting is on, the audio can drop by the dB value of the selected setting before the AGC reacts.

This can greatly help preserve natural program dynamics without compromising overall gain-riding ability. Try settings of -3 to -6dB to start.

RTP Level: RTP stands for Return to Platform. What RTP does is return the gain of the AGC to the selected amount of gain reduction or "platform level" in the absence of audio. This control adjusts the "resting" or "platform" gain reduction level the AGC will return to when audio pauses or stops (while gated).

The primary purpose of RTP is to prevent the AGC gate from increasing the gain unnecessarily or holding the gain too low during pauses in audio, which could result in an increase in noise level or unexpected sudden increase in level when the audio returns.

RTP Speed controls how fast the adjustment to the platform level (set with the **RTP Level** control above) takes place – i.e., how long it takes the AGC to move to the target RTP gain reduction level. Range is from "0" (slow) to 11 (fast).

Makeup Gain sets the amount of gain to be filled in during quieter, softer program passages. The range is "0.0" (off) to "11" (maximum). This function is also program dependent, and it interacts somewhat with the main Attack and Release time constants. As the attack/release times are modified, the system also scales the *Make-Up Gain* time constants. Use *less* makeup gain for processing more faithful to the source material; use *more* makeup gain for greater loudness and "density" (a more "compressed sound).

Filter Freq (High-pass Filter Frequency): This drop-down control adjusts the cutoff frequency of the built-in high-pass (lo-cut) filter. Available settings are "Out" (not recommended), "20 Hz", "30 Hz" and "40 Hz". A setting of at least "20 Hz" is suggested for most formats to keep sub-sonic signals from affecting the processing performance.

Ratio: This variable control adjusts the overall compression ratio of the Wideband AGC. Available settings range from 2:1 to 10:1. Lower ratios will let more dynamics through to the following multi-band AGC section and are preferred for most applications. A good starting point for most popular music formats is 3:1 or 4:1. These will provide very smooth, smart, hand-on-the-pot level control. The 2:1 ratio is very gentle and may be preferable for classical music or jazz. Higher ratios are useful primarily for talk programming or anywhere there is a desire to have tighter control over very dynamic program material and/or a more processed sound. **NOTE:** Higher ratios can cause the WB AGC to "overreact" on denser program material such as modern popular music, especially with faster attack times and slower release times, so use with caution. Keep in mind that there is another 5-Band AGC section that follows, so more gentle control at this stage is normally preferred.

ENH (Basic Tab)

Touch the **ENH (Enhance)** button to display the controls for the Omnia.11's bass and stereo enhancement functions. There are 4 variable controls located here:

Enhancers Menu (Basic Tab)

Deep Bass: This controls the amount of deep bass enhancement. The deep bass range includes kick drum and low toms as well as low organ pedal notes, bass synthesizer and the lower notes on the bass guitar. A setting of "0.0" effectively turns bass enhancement off. The smart bass enhancer will add bass to bass-shy material without "overdoing it" on material that already has enough bass.

Phat Bass: This control adds additional bass enhancement that can give your station a "phatter" sound, especially on radios with small speakers that lack actual deep bass. This is a brand new Phat Bass algorithm that fattens things up without muddiness.

Warm Bass: This control helps compensate for program material that is naturally lacking in upper-bass fullness. Like the other bass enhance controls above, this one is "smart" as well, but be judicious about applying too much. A little can give nice, subtle warmth to voices and other program material that may otherwise sound too thin.

Air Enh (Air Enhance): This adds "sheen" to the highest audio frequencies (the highest treble and harmonics of midrange material) to provide a sense of "Air" to the program material, especially older material, without sounding screechy, increasing compression effects or sounding "smashed" in any way. Contrary to what you might think, the effect is most noticeable on material such as vocals, rather than on fundamental treble instruments like cymbals etc.

Stereo Enh (Stereo Enhance): This controls how much of the Omnia's built-in stereo enhancement effect is applied. The Omnia.11 contains an intelligent DSP-based stereo enhancement tool that enhances the stereo sound field without causing unnatural "hole in the middle" imaging or exaggerated multipath. Program audio previously lacking in stereo width will have noticeably increased ambiance and dimension when the **Stereo Enh** is active. Vocals will stay up-front and the sonic details of musical instruments will be heard with an apparent slight loudness increase.

The **Stereo Enh** control has a range of "0.0" (OFF) to 11 and the amount of dynamic width expansion can be observed on the rightmost vertical bargraph marked "ST" in the Meter Area. The system should be initially auditioned using light amounts of stereo enhancement**,** with an initial setting of 4 to 6 recommended as a starting point. The overall stereo sound field will appear wider and be much more consistent sounding between program sources. The smart Stereo EXP algorithm turns off when a mono program source is present.

AGC

The 5-Band AGC section works on the *average* level of the program material and can act both as a dynamic equalizer and as a compressor/leveler depending on settings and the dynamics in the program material itself.

There are 3 control groups in the 5-Band AGC section, XO, AGC and Mixer:

The output of the Wide Band AGC section feeds the 5-Band AGC section through a crossover.

There are 5 variable controls in the Basic tab for the AGC crossover and 2 drop-down controls in the Advanced tab.

AGC Crossover (Basic Tab)

AGC Crossover Menu (Basic Tab)

Each of the 5 AGC bands (LO, ML, MH HI and SH) has a **Drive** control.

Each of these controls the input level to the respective band over a range of + or – 12dB and, therefore, how far it will be driven into gain reduction. Higher settings increase the amount of "compression" in the band.

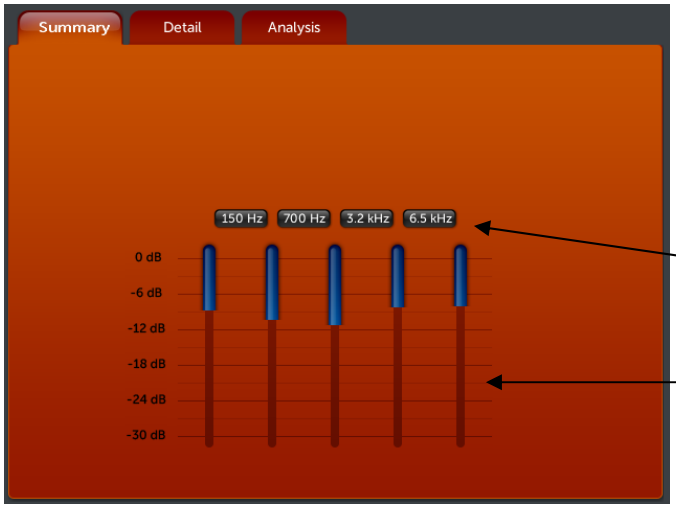
AGC Crossover (Advanced Tab)

AGC Crossover Screen (Advanced Tab)

The 2 drop-down controls in the Advanced tab allow you to modify the crossover frequency points of the MH (ML to MH) and LO (LO to ML) AGC bands. The MH to HI and HI to SH crossover points are not adjustable.

The available MH crossover settings are 3.2 kHz and 2.5 kHz.
The available LO crossover settings are 190 Hz or 150 Hz.

AGC Metering (Summary Tab)



The 5 gain reduction meters show AGC activity from the top down in dB and the AGC crossover frequencies in use are shown just above the gain reduction meters. Gating is indicated by bright yellow outlines around the blue gain-reduction meters.

Crossover Frequencies

5-Band AGC Gain Reduction Meters

AGC Metering Screen (Summary Tab)

AGC (Basic Tab)

There are 6 variable controls here and 5 of them are "global". That is, they affect all 5 bands of the AGC simultaneously and equally. There are also 2 buttons to access the controls for the low-latency DJ monitor feature.

The first global control is an overall **Drive** control. It sets the input level to the AGC section, allowing you to adjust the amount of gain reduction in the entire 5-Band AGC section at once. Increase this control for more compression and dynamic EQ effect.

Next are overall controls for **Gate Threshold, Attack Time, Release Time and Detail** Enhancement. These are described in detail below. These parameters can also be individually adjusted for each in the Advanced tab relative to this master or "offset" control setting.

Multi-Band AGC Menu (Basic Tab)

Attack Offset (Overall Attack Time): The attack control adjusts how fast the AGC responds to sudden increases in audio level, and higher numbers equate to faster response times.

Faster attack times reduce the transient nature of the input audio, while slower attack times improve it. Extremely slow attack times must be used with caution because the following limiter stage may be forced to work too hard or be overloaded. Extremely fast attack times must also be used with caution because they may make the audio sound too compressed and lifeless, losing too much of its natural dynamic character.

Release Offset (Overall Release Time): The release control adjusts how fast the AGC recovers from periods of more gain reduction when the input audio levels fall. Faster release times (higher numbers) result in a more dense sound.
Even though the Omnia uses program controlled release algorithms, setting the control for extremely fast release times can result in 'pumping'. Extremely slow release times can result in loss of loudness and frequency balance issues when the program levels drop.

Gate Master (Overall Gate Threshold): When the input audio falls below a certain level, the gain control action of the AGC stage is "frozen" by the gate. If the audio remains below the threshold level for a time, the RTP feature takes effect (see below). The level at which this freeze, or hold takes place is controlled by the setting of the Gate Threshold control. Higher numbers cause the gate to activate at higher audio levels.

In most applications this control should be adjusted between about 1.0 and 2.0. The action of gate also prevents noise rush up during periods of no audio or during pauses in speech. Lower settings will also allow more dynamic EQ activity (depending also on the **Sync** setting).

Lastly are the **Sync** and **Detail Master** controls:

Sync: This controls the amount of adjacent band syncing in the 5-Band AGC, relative to the middle (MH) band. A setting of "0.0 dB" provides maximum sync between the bands. At this setting, almost no dynamic EQ effect will take place. A setting of "-2.0 dB" will allow 2 dB more "independence" in the immediately adjacent band and 4 dB in the second-adjacent bands. Use lower settings (along with lower settings of the **Gate Thresh** controls) to get more dynamic EQ effect. Use higher settings to preserve the frequency balance of the original program material.

Detail Master This is an overall control that adjusts the amount of detail enhancement in all 5 processing bands simultaneously.

Detail enhancement gives a "lift" to lower level program material that can otherwise get "lost" with heavy processing. In fact, using detail enhancement can allow you to back off the amount of overall limiter drive needed to get "that sound". Try it! A setting of "0.0" effectively turns detail enhancement off.

NOTE: When Detail Enhance is turned on, there are also individual settings for each band in the Advanced tab. Be careful not to apply too much Detail Enhance to any one band as background noise can be brought up during very quiet passages or silence. Also, typically, Detail Enhance is not applied (or very little is applied) to the LO and SH bands due to the greater chance for rumble and noise to be brought up. That's OK because the real power of Detail Enhance lies in the midrange frequencies.

Low-Delay DJ Monitor Output

The new low-latency DJ Monitor Output features an analog input to output delay of only about 8ms, (this is actually slightly less than the Omnia.6EX) so it is perfect for DJ headphone monitoring. It also has a nicely compressed sound that DJ's will like. The normal main output's latency is 36.5ms, too much for headphone monitoring. If your station is using a profanity delay ahead of the Omnia, a separate processor such as our Omnia ONE Studio Pro can be used on your pre-delay feed to give the DJ's a comfortably processed headphone feed.

The DJ output has its own crossover and 3-Band processing.

The DJ output can be routed to any of the Omnia.11's outputs in the Output menu.

DJ Mix(er) (Basic Tab)

DJ Mix: The controls here allow you to get a customized mix of the 5-Band AGC sections' output to feed the special DJ processing. Each band defaults to a "middle" setting of 0.0dB so your changes will be offsets in + or – dB.

You can use these controls like a 5-Band equalizer to tailor the sound applied to the DJ 3-Band processing section.

These controls will not affect the main processing path.

DJ Lim(iter) (Basic Tab)

DJ Lim: Here you will find **Mix** controls for each of the 3 DJ Limiter bands, post-processing, an **Output Master** level control and **Density** management controls for each of the 3 bands.

The **Density** controls set the aggressiveness of the DJ processor, higher settings giving a more processed and compressed sound and lower settings giving a more open sound. There are Density controls for each of the 3 bands and an overall master setting that adjusts all 3 bands at once.

AGC (Advanced Tab)

7 Sub-Group controls for each AGC band become available in the Advanced tab.

Multi-Band AGC Menu (Advanced Tab)

The **Gate_Thresh** control allows you to adjust the gate threshold of each band individually.

RTP Level, RTP Speed and Makeup Gain controls do not appear in the Basic tab and must be set individually for each band.

RTP Level: RTP stands for Return to Platform. What RTP does is return the gain of the AGC to the selected amount of gain reduction or "platform level" in the absence of audio. This control adjusts the "resting" or "platform" gain reduction level the AGC will return to when audio pauses or stops (while gated).

The primary purpose of RTP is to prevent the AGC gate from increasing the gain unnecessarily or holding the gain too low during pauses in audio, which could result in an increase in noise level or unexpected sudden increase in level when the audio returns.

RTP Speed controls how fast the adjustment to the platform level (set with the **RTP Level** control above) takes place – i.e., how long it takes the AGC to move to the target RTP gain reduction level. Range is from "0" (slow) to 11 (fast).

Makeup Gain: Sets the amount of gain to be filled in during quieter, softer program passages. The range is "0.0" (off) to "11" (maximum). This function is also program dependent, and it interacts somewhat with the main Attack and Release time constants. As the attack/release times are modified, the system also scales the *Make-Up Gain* time constants. Use *less* makeup gain for processing more faithful to the source material; use *more* makeup gain for greater loudness and "density" (a more "compressed sound).

The **Attack** and **Release** controls in each band sub-group are allow you to set the timing parameters individually for any desired band.

Detail Enh(ance)**:** When the **Detail Master** is turned on in the Basic tab, the Offset control in each band allows you to control the amount of detail enhancement in each band. Typically, less detail enhancement is desirable in the LO, HI and SH bands, while more is generally used in the ML and MH bands.

AGC Mixer (Basic Tab)

The output of each of the 5 AGC bands is then summed together in a mixer.

AGC Mixer (Basic Tab)

There are 5 variable controls (LO mix, ML mix, MH mix, HI mix and SH mix) in the Basic tab for the Mixer that set the output level of each of the 5 AGC bands over a + or – 12dB range.. There are no Advanced tab controls for the mixer.

These controls can be used to set up some frequency balance contours (EQ) but be careful not to use extreme settings.

The output of the AGC mixer feeds the crossover of the Limiter section directly.

Limiters

Similarly to the 5-Band AGC section, the Limiter section has 3 control groups:

Crossover, AGC and Mixer

The limiters differ from the AGCs in that the limiters work only on the *peaks* of the audio signal instead of the *average*.

There are 6 variable controls in the Basic tab and 2 drop-down controls in the Advanced tab.

Limiters Crossover (Basic Tab)

The output of the 5-Band AGC mixer feeds the 6-Band Limiter section through its own crossover.

Limiters Crossover Menu (Basic Tab)

Each of the 6 Limiter bands (LO, ML, MH HI and SH) has a **Drive** control.

Each of these controls the input level to the respective limiter band over a range of + or – 12dB and, therefore, how far it will be driven into gain reduction. Higher settings increase the amount of "density" in the band.

You may have noticed that there are actually 2 ways to control levels that are getting to the limiters: the AGC Mixer and the Limiters Crossover. Please use care that similar bands are not boosted or cut too much in either or both of those sections.

Limiters Crossover (Advanced Tab)

Limiters Crossover Menu (Advanced Tab)

The 2 drop-down controls in the Limiters crossover Advanced tab allow you to modify the crossover frequency points of the LO (LO to ML) and SL (SL to LO) limiter bands. The ML to MH, MH to HI and HI to SH crossover points are not adjustable.

The available LO crossover settings are 320 Hz and 420 Hz.

The available SL crossover settings are 200 Hz, 175 Hz or 110 Hz.

Limiters Metering (Summary Tab)

Limiters Metering Screen (Summary Tab)

Similarly to the AGC gain reduction meters, the 6 limiter band gain reduction meters show the amount of limiter activity from the top down in dB and the crossover frequencies in use are shown just above the meters. Likewise, gating activity is indicated by a bright yellow outline around each gain-reduction meter.

Limiters (Basic Tab)

There are 4 variable controls in the Limiters menu area and all of them are “global”. That is, they affect all 6 limiter bands simultaneously and equally.

Limiters Menu (Basic Tab)

The first global control is an overall **Drive** control that allows you to adjust the amount of gain reduction in the entire 6-Band Limiter section at once. This is (conveniently) just like changing the value of each control in the limiters crossover **(XO)** by the same amount.

Next are **Attack Time Offset, Release Time Offset** and **Gate Threshold Offset** controls. These can adjust all 6 bands simultaneously relative to the individual control settings in the Advanced tab. Descriptions of the Attack, Release and Gate functions are described in detail in the Advanced tab section below.

Limiters (Advanced Tab)

Limiters Menu (Advanced Tab)

Sub-Group controls for each AGC band become available in the Advanced tab:

Lim Thresh (Limiter Threshold): This adjusts the threshold where audio peak limiting occurs over a + or – 6dB range for each band. Lower settings will increase the amount of limiting and decrease the level going to the following final limiter stages.

Conversely, higher settings will raise the limit threshold, causing less limiting but feeding more level into the following final limiter stages.

Care is needed when adjusting this control because higher settings will cause less limiting to occur, and the resulting uncontrolled peak energy will go to the following final limiter/clipper stages instead. Thus, with this control you can artistically trade off dynamic limiting against brick wall final limiting/clipping, as each has its own "sound."

As the limiter threshold is lowered, (made more negative) the peak output level of the limiter is reduced. The signal in that band won't hit the clipper as hard, and you'll notice more action on the limiter bargraph for that band. In fact, instead of reducing the output of one of the audio bands in the Final Mixer section, you could instead "dynamically reduce" the level in that band (which also increases density in that band) by lowering the limiter threshold.

When adjustments are made to limiter thresholds, start by making adjustments in 0.5dB steps. Reducing the threshold too much can cause the system to create an effect that "sucks out" the frequencies in that band. Conversely, the opposite (raising the threshold) will create an exaggerated effect by over-enhancing certain frequency ranges, as well as causing increased distortion, since excessive levels from that band will reach the following clipper stage.

Usually, the limiter thresholds are adjusted as a "fine polish" on the final sound. If you are unsure about how to use the **Lim**it **Thresh**olds, then we recommend that they be left at their well-researched factory settings

SL to LO Sync appears only in the **SL** sub-group. This controls how much the gain reduction of the SL band limiter's "slower" component is synchronized to the LO band limiter's "slower" component. A setting of "-12.0 dB" (all the way "down") turns the synchronization off. Higher settings will allow the SL band's gain-reduction to track the LO band's over the dB range of the control setting. This is useful to avoid the buildup of low frequency room noise or rumble in the input audio when the limiters are being used fairly hard. With less limiter activity, this will have less effect since you will see mostly the limiter's "fast" component working

Attack (Attack Time): The attack control adjusts how fast the limiter's "slower" component responds to sudden increases in audio level, and higher numbers equate to faster response times. Faster attack times reduce the transient nature of the input audio, while slower attack times improve it. Extremely slow attack times must be used with caution because the following clipper stage may be forced to work too hard, causing excessive distortion. Extremely fast attack times must also be used with caution because they may make the audio sound too compressed and lifeless, losing too much of its natural dynamic character.

Release (Release Time): The release control adjusts how fast the limiters recover from periods of more gain reduction. Faster release times (higher numbers) result in a more dense sound. Setting the control for extremely fast release times can result in increased distortion or 'pumping'. Extremely slow release times can result in loss of loudness and frequency balance issues when the program levels drop.

Gate (Gate Threshold): When the input audio falls below a certain level, the gain control action of the limiter stage is "frozen" by the gate. The level at which this freeze, or hold takes place is controlled by the setting of the Gate Threshold control. Higher numbers cause the gate to activate at higher audio levels, causing increased overall gating activity..

It is normal to see much less gating activity in the limiters, unlike the AGCs since the limiters operate much faster and average levels are already controlled before reaching the limiter section. You will see more limiter gating activity when hitting the limiters harder, especially on dynamic material such as speech where they will help keep things sounding natural.

Limiters Mixer (Basic Tab)

This is the final mixer that sums the 6 limiter bands and sends the peak limited audio to the final FM pre-emphasis and limiter/clipper stages.

Limiters Mixer Menu (Basic Tab)

Care should be used when adjusting this section, as too much level from any particular band could cause an excessive amount of clipping distortion to that range of frequencies.

Adjusting all 6 controls an equal amount is virtually the same as adjusting the **Clip Drive** control.

If your desire is to provide some custom "EQ" to the sound, it is better to perform that function using the **XO** controls instead of the **Mixer** controls.

Like the **Lim**iter **Thresh**old controls, the final **Mixer** is mainly for minor "fine polish" to the overall sound. Adjustments in this section must be done with extreme care.

FM

FM Final Limiter (Clipper) (Basic Tab)

Clipper Menu (Basic Tab)

The Ultra LoIMD main clipper is the Omnia.11's final limiting stage for the analog FM channel. Here is where the Omnia.11's loudness *and* quality advantage is most evident! This new extremely powerful new algorithm utilizes a great amount of DSP power and is designed to reduce clipper-induced IM distortion to the bare minimum across the entire audio bandwidth, providing new, previously unheard of levels of clarity and loudness with minimal side-effects.

Touch the **CLIP** button to access the 3 variable controls located here.

The clipper **Drive** control controls the depth of clipping in precise 0.1dB steps over a +/-6 dB range. This is the primary control over the "loudness vs. distortion" tradeoff. (along with the **Auto Sense** control in the Advanced tab) It is advisable to make minor changes, primarily as the 'loudness fine tuner'. Be careful! There is a lot of available power here!

We suggest that each time you try a new factory preset, you adjust the Clip Drive as follows: Start with the default setting for a preset and adjust it down in 0.5 dB steps until the loudness just drops below the desired level and then bring it up slightly from there. This should be the optimum setting for your station and market.

The **Voice Quality** control adjusts how much the Omnia.11 will reduce the clipping automatically when mono voice transmission is detected. This really helps to keep voices clean and full yet still loud and punchy. A setting of "0.0" effectively turns this feature off. Typical settings will usually be in the "-0.5 to -1.0" dB range. If you cannot get certain voices clean even when using this feature, that voice may be very asymmetrical. Make sure that the **Phase Rotator** switch in the **Wide Band** AGC menu is turned on or that phase rotation is enabled in your microphone processing, if available.

NOTE: For optimum performance of this feature, make sure the left and right channels feeding the Omnia.11 are very well balanced.

Comp Clip Drive: This controls the drive to the DSP-based composite clipper in the Stereo Generator in dB. A setting of 0.0dB is the same as the clipper being "off ". This clipper operates on the entire baseband signal up to 53 kHz, except for the 19 kHz pilot. No matter how hard you drive the composite clipper, you cannot clip the stereo pilot. Embedded within the composite clipper is a newly designed phase linear low pass filter for superb SCA protection. This filter removes clipping harmonics and prevents them from affecting the SCA and RDS region.

Please use the composite clipper sparingly. We suggest no more than about 0.5dB and you may find that none is needed at all with the Omnia.11!

FM Final Limiter (Clipper) (Advanced Tab)

There are 4 variable controls and 1 Off/On switch in the FM Advanced tab.

Clipper Menu (Advanced Tab)

Bass Style: This switch chooses between 2 available processing styles, Dynamic and Fixed, for the Omnia.11's Bass Clipper. The bass clipper is a special filtered and fully anti-aliased clipper stage just for the bass frequencies. Its job is to keep the bass out of the main clipper as much as possible, reducing distortion while maintaining or increasing bass intensity and quality.

Dynamic: This mode observes the set threshold but will automatically "let the bass out" if only bass is present, increasing the impact of solo bass and kick drum while ensuring that it stays clean.

Fixed: The bass clipper threshold mode is fixed so solo bass or kick drum will not be enhanced.

Bass Clip Threshold: This sets the threshold level of the Bass Clipper over a range of + or – 6dB. Negative threshold settings indicate the maximum amount that the bass clipper will pull the bass out of the main clipper to help prevent distortion.

Bass Clip Smooth: This control adds a smoothing filter to the bass clipper that can make it sound less harsh on some material. The default is all the way up (11.0). The control is here if you prefer your bass to sound "harder" and less smooth, similar to the Omnia-6's bass clipper's "Tight" setting.

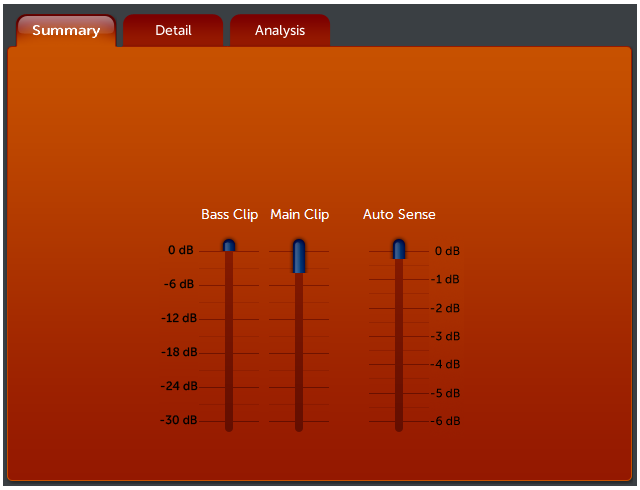
Auto Sense: This special algorithm senses the "duty cycle" of the clipper by watching for excessive clipper activity that may cause distortion. A setting of "0.0" turns Auto Sense off. Higher settings will automatically detect excessive clipping and reduce the clipper drive.

It is advisable, especially when tuning the processing for maximum loudness, to set this control first to "0.0",adjust the main **Clip Drive** in the FM Basic tab and then come back here and turn the **Auto Sense** control up until you just

hear it reduce the loudness too much, then back it off a little from there. **NOTE:** Try experimenting with the balance between Clipper Drive and Auto Sense for your best loudness vs. distortion compromise. Try not to let the Auto Sense average gain-reduction exceed about 2dB though. Short-term peaks above that are fine.

Bass Thump: When using a lot of **Deep Bass** enhancement (in the WB / ENH menu), higher settings will allow more "thump" through. Lower settings provide a "rounder" bass sound. Note that even at higher settings, there will never be any artifacts or "clicky" bass sound. If more of a "clicky" bass sound is desired, turn down the **Bass Clip Smooth** control instead.

FM Channel Clipper Metering



Clipper Metering (Summary Tab)

The FM channel's metering shows you the activity for the Bass Clipper, Main Clipper and Auto Sense.

These are gain-reduction meters similar to those in the Limiter section and read from the top down.

Note the reduced range of the Auto Sense meter which is 6dB instead of the 20 dB of the Bass and Main clip meters.

HD

HD Final Limiter

The Omnia.11's HD channel shares the same processing as the FM channel up through the 6-Band Limiter stage. The HD channel gets its own final mixer, bass enhancer and final limiter plus Omnia's exclusive Sensus® technology for minimizing codec artifacts at lower bitrates.

HD Channel Limiters Mixer (Basic Tab)

HD Limiters Mixer Menu (Basic Tab)

Shown at left is the final mixer that sums the 6 limiter bands and sends the peak limited audio to the HD final limiter stage.

Care should be used when adjusting this section, as too much level from any particular band could cause an excessive amount of final limiter activity to that range of frequencies.

That said, you can use these controls carefully to optimize the overall frequency balance for the HD channel, especially if the FM channel is set up aggressively.

Adjusting all 6 controls an equal amount is virtually the same as adjusting the final limiter's **Drive** control.

HD Channel Metering

HD Metering (SummaryTab)

The HD channel's metering shows you the activity in the Bass Clipper, Sensus codec conditioner and Final Limiter.

These are gain-reduction meters similar to those in the Limiter section and read from the top down.

HD Channel Bass Enhancer (Basic Tab)

Touch the **Bass** button to display the controls for the HD channel's bass enhancement functions. There are 4 variable controls located here:

HD Bass Enhancer Menu (Basic Tab)

Bass Enh(ance): This controls the amount of bass enhancement applied to the HD channel. A setting of "0.0" effectively turns bass enhancement off. The smart bass enhancer will add bass to bass-shy material without "overdoing it" on material that already has enough bass.

Phat Bass: This control adds additional bass enhancement that can give your station a "phatter" sound, especially on radios with small speakers that lack actual deep bass. This is a brand new Phat Bass algorithm that fattens things up without muddiness.

Bass Clip Smooth: This control adds a smoothing filter to the bass clipper that can make it sound less harsh on some material.

Bass Clip Threshold: This sets the threshold level of the Bass Clipper over a range of + or – 6dB. Negative threshold settings indicate the maximum amount that the bass clipper will pull the bass out of the main clipper to help prevent distortion.

There are no controls in the **Advanced** tab for the **Bass** section.

HD Final Limiter (Basic Tab)

The HD channel employs an advanced look-ahead limiter to provide absolute precision peak control. This limiter has been designed to minimize processing side-effects like IM distortion, which are usually associated with limiters of this type. This allows this limiter to sound extremely transparent.

This type of peak controller is used instead of a clipper because it does not generate the same high levels of harmonic distortion as a Clipper does. This distortion would cause added difficulties in a coded audio system because the harmonics generated from the clipping action create added artifacts and workload in the encoder. These are especially annoying at high frequencies.

There are tradeoffs in how each of these peak controllers sound when they are set to produce added loudness. When a clipper is pushed, the audio may sound *edgier.* This is from the added harmonic content. In contrast, the look-ahead limiter will sound *busier,* or denser, when more limiting is applied.

HD Final Limiter Menu (Basic Tab)

The ***Drive*** control controls the depth of final limiting. The amount of gain-reduction occurring in the final limiter can be monitored on the Process metering bargraph screen. Note, however, that this meter cannot show extremely fast action in the limiter, so your ear must be the final judge.

Release: The release time control for the final limiter adjusts its overall release time profile. Lower numbers are slower overall and higher numbers are faster. Faster release times will result in more loudness but sound more "squashed".

Sensus® (Basic Tab)

There are 2 variable controls in the Sensus menu: **Sensus Level** and **Sensus Freq(uency)**:

Sensus® Menu (Basic Tab)

Sensus Level: Sets the amount of codec conditioning to be applied to the audio. Increasing the setting adds more SENSUS® control. Extreme settings -- those high enough to cause noticeable dulling of the program material -- are unnecessary and will not further improve the audio quality through the codec.

Sensus Freq(uency): This sets the range where the SENSUS® function begins its magic. For example, a setting of 5kHz will program the SENSUS® algorithm to focus on frequencies of 5kHz and higher. You should start with the 13kHz setting, and then select lower frequency settings until any coding artifacts are tamed. There are 8 available adjustment frequencies between 13kHz and 1kHz.

What is Sensus®?

First we will present some important information about our unique *Sensus*® technology that will allow you to maximize the audio quality and minimize the audible artifacts of the codec process:

Overview

Until now, digital signal processing has been a more precise numeric implementation of well-known analog methods. Even relatively recently designed digital audio processors couldn't veer too far from the comparatively simplistic concepts that analog dynamics processing had utilized… until now!

Our new *Sensus*® technology takes digital dynamics processing into a completely new frontier. Instead of the two-dimensional static processing architecture of the past, *Sensus*® enables the audio processor to modify its own architecture in real time and in response to ever-changing program content.

Simply stated, *Sensus*® has the ability to "sense" what must be done to a signal in order to best tailor it for the following codec. As program content changes, it "rearranges the algorithms" to accomplish this goal. The uniqueness of the *Sensus*® technology makes it highly suitable not only for codec pre-conditioning (or provisioning), but also for a range of other highly specialized signal processing challenges. The following is a discussion of how *Sensus*® technology can be applied to a coded audio environment.

Codec Provisioning

The codec is now a common denominator in the world of audio and broadcasting. Digital broadcasting (HDTV, HD-Radio^{R}, DAB, DRM), podcasting, webcasting, cellcasting, and downloadable music files all employ a form of codec-based data compression in order to minimize the bandwidth required to transmit data. The necessarily low bitrates utilized by these mediums presents a tough challenge for any audio processor used prior to a codec.
Traditional dynamics processors were designed to fulfill the requirements of a medium where the functions were generally *static*. That is, they were well suited to the rather simplistic peak control and bandwidth limiting methods that were required for analog broadcasting, as well as for the signal normalization techniques used in recording and mastering. Audio codecs on the other hand are moving targets - each codec algorithm has its own set of artifacts. So not only does the sonic quality vary depending on the algorithm and bitrate used, but more importantly they vary in their ability to mask their own coding action. This is why we call it a 'moving target', and is why conventional audio processors fall short in a coded audio environment and can actually make coding artifacts worse due to their inability to adapt appropriately to the changing operation of the codec as the program content changes.

Prior art in audio dynamics processing could only address *some* of the challenges of provisioning audio for coding. This hurdle existed because the codec adapts to the incoming program (so as to generate the least amount of output data representing the input audio) causing the sonic artifacts generated by the process to continually change. Unless the audio processor can predict these changing characteristics of the codec, it can't possibly create output audio that is perfectly tailored for the coding process.

Conventional processors utilize rather simplistic high frequency limiters and fixed low pass filtering that does not change with the program material. When these less intelligent processors feed a codec the audio might sound acceptable one moment and offensive the next. Because they cannot "know" what the codec will do next, the result is over-compensated, dull and lifeless audio… audio that *still* contains objectionable codec-generated artifacts!

HD Radio®

The advent of HD Radio^{R} has introduced the capability to transmit multiple program streams, or "Multicast", within a single 96kbps digital broadcast data channel. To facilitate this, multicast relies on the use of codecs with comparatively low bitrates. A broadcaster can choose to transmit a number of multicast channels and select the bitrate for each one. However, the more multicast channels there are, the lower the bitrate each channel must have in order for them to all fit within the total available bandwidth.

To achieve maximum sound quality, *the kind that attracts and holds listeners*, those channels will need specialized dynamics processing capable of creating great sound *regardless* of program content and bitrate. They will need *Sensus*®.

With *Sensus*®, the innovative algorithm, it is now possible to have consistently high audio quality with a minimum of codec-induced artifacts. *Sensus*® creates highly listenable audio lacking the dull, muffled, 'swirley' sound usually associated with codecs operated at extremely low bitrates.

So… what's so smart about Sensus®?

The fact is, *Sensus*® is smart. In real time it predicts program content that will be troublesome for the codec, and by modifying it's own algorithms can make appropriate changes to the program material before it ever reaches the codec![1] The result is consistently high audio quality through a codec-based system, even at very low (18kbps – 21kbps) bitrates.

The human voice is very difficult to code at low bitrates without quality and intelligibility suffering. But Omnia.11 with *Sensus*® can generate clean, smooth, crystal clear audio that's consistently great sounding no matter what the codec or bitrate is.

--- Important Note ---

[1] It is *extremely* important (especially for bitrates below 96kbps) not to directly audition the HD output of the Omnia.11 for audio quality without the audio being first routed through a codec!

Why? The processed HD output has been 'pre-corrected' for the characteristics of the following codec and because of this the audio may contain strange sounding artifacts that will imitate the 'inverse' of what that codec will do. Because of this the audio exiting the Omnia.11 may be unpleasant to listen to and will certainly be inferior to that which will exit the codec later on. In other words, what you hear at the output will bear no relationship to the audio quality that will be achieved ***after*** the audio has passed through the coding process!

Need a corollary to this?

It's like trying to taste a pizza while still in the grocery store staring at the raw ingredients that haven't been purchased yet!

Appendix A: Performance Specifications

Omnia.11 FM

All specifications are subject to change without notice.

Note: Discrete I/O measurements have been made in "Bypass" mode. FM composite measurements have been made using the "Proof_of_Perf" preset.

General Audio Specifications

Frequency Response: Complies with the standard 50 or 75 microsecond pre-emphasis curve within ± 0.5 dB, 30 Hz to 15 kHz. The analog left/right outputs and AES/EBU Digital outputs can be configured for flat or pre-emphasized output.

System Distortion: Less than 0.01% THD, 20 Hz – 7.5 kHz. Second harmonic distortion above 7.5 kHz is not audible in the FM system.

***Signal-Noise Ratio:** > -80 dB de-emphasized, 20 Hz –- 15 kHz bandwidth, referenced to 100% modulation).

***The measured noise floor will depend upon the settings of the Input and Output Gain controls and is primarily governed by dynamic range of the Crystal Semiconductor CS5361 A/D Converter which is specified as >110 dB. The dynamic range of the internal digital signal processing chain is >144 dB.**

Stereo Separation: Greater than 65 dB, 20 Hz –- 15 kHz; 70 dB typical.

Crosstalk: > -70 dB, 20 Hz -- 15 kHz.

System Latency: 36ms. “FM” channel, as measured from the analog inputs through the composite MPX output.

Composite Outputs: Source Impedance: 5 ohms or 75 ohms, jumper-selectable. Single-ended and floating over chassis ground.
Output Level: 0V to 10V in 0.05V steps, software adjustable.
D/A Conversion: Texas Instruments/Burr Brown PCM1798, 24-bit sigma-delta converter.
Configuration: Two electrically independent outputs. Software based level adjustment.
Load Impedance: 50 ohms or greater load is suggested.
Pilot Level: Adjustable from 4.0% to 12.0% in 0.1% steps and OFF.
Pilot Stability: 19 kHz, ± 0.5 Hz.
Signal-to-Noise Ratio: -85 dB typical, 75 µS de-emphasized, 15 kHz bandwidth, referenced to 100% modulation).
Distortion: < 0.02% THD 20 Hz – 15 kHz bandwidth, 75 µS de-emphasized, referenced to 100% modulation.

Stereo Separation: > 65 dB, 30 Hz – 15 kHz.
Linear Crosstalk: > -80 dB, main to sub or sub to main channel (referenced to 100% modulation).
Non-linear Crosstalk: > -80 dB, main to sub or sub to main channel (referenced to 100% modulation).
38 kHz Suppression: > 70 dB (referenced to 100% modulation).
76 kHz Suppression: > 80 dB (referenced to 100% modulation).
Pilot Protection: > -65 dB relative to 9% pilot injection, ± 1 kHz.
57 kHz (RDS/RBDS) Protection: better than -50 dB.

Connectors: Two EMI suppressed female BNC, floating over chassis ground.
Maximum Load Capacitance: 5nF (at 10 ohms source impedance).
Maximum cable length: 100 feet/30 meters RG-58A/U.

Analog Audio Input: Left/Right Stereo.
Electronically balanced.
Input impedance 10k ohms resistive.
Maximum Input Level: +22 dBu.
Nominal Input Level: +4dBu, which nets a -18dBFS input meter reading on a steady-state signal when the Input Gain control is set to 0.0dB. Program material with a nominal average level (VU reading) of +4dBu will typically produce peak readings on the input meter in the range of -12 dBFS to -6dBFS. This is the correct operating level.

A/D Conversion: Crystal Semiconductor CS5361, 24 bit 128x over-sampled delta sigma converter with linear-phase anti-aliasing filter. Pre-ADC anti-alias filter, with high-pass filter at <10 Hz.

Connectors: Two, EMI-suppressed XLR-female. Pin 1 chassis ground, Pin 2 "Hot".

Analog Audio Output:
Left/Right Stereo. Electronically balanced. Output Impedance 20 ohms.
Minimum load Impedance: 600 ohms.
Output Level adjustable from -2 dBu to +22dBu peak in 0.1dB steps.

D/A Conversion: Crystal Semiconductor CS4391, 24 bit, 128x oversampled.

Connectors: Two, EMI-suppressed XLR-male. Pin 1 chassis ground, Pin 2 “Hot".

Digital Audio Input: Configuration: Stereo per AES/EBU standard, CS8420 Digital Audio Transceiver with 24 bit resolution, software selection of stereo, mono from left, mono from right or mono from sum. Automatically accepts and locks to input sample rates between 30 and 108 kHz.

Connector: XLR-female, EMI-suppressed. Pin 1 chassis ground, pins 2 and 3 transformer isolated, balanced, and floating – AES3 standard 110 ohm impedance.

Digital Audio Output #1: Stereo per AES3 standard. Output can be configured in software for flat or pre-emphasized response at 50 or 75 microseconds.
Digital Sample Rates: Output sample rates software selectable for 32kHz,44.1kHz, 48kHz, and 96 kHz.

Connector: XLR-male, EMI-suppressed. Pin 1 chassis ground, pins 2 and 3 transformer isolated, balanced, and floating. Standard AES3 specified 110 ohm source impedance.
Digital Output Level: -22.0 to 0.0 dBFS software adjustable.

Digital Audio Output #2: Stereo per AES3 standard. Output can be configured in software for flat or pre-emphasized response at 50 or 75 microseconds.
Digital Sample Rates: Output sample rates hardware jumper selectable for 32kHz,44.1kHz, 48kHz, or 96 kHz, or its rate slaved to AES #1.

Connector: XLR-male, EMI-suppressed. Pin 1 chassis ground, pins 2 and 3 transformer isolated, balanced, and floating. Standard AES3 specified 110 ohm source impedance.
Digital Output Level: -22.0 to 0.0 dBFS software adjustable.

External Sync Input: External Sync: Output sample rate can be synchronized to the signal present on the AES/EBU input, or to an AES3 signal applied to the Ext. Sync input connector. (does not accept Word Clock inputs)
External Sync Range: Accepts sample rates from 32kHz to 96 kHz.
Used for synchronization of the Digital Output signal to an external reference. Automatically accepts sample rates between 32 and 96 kHz.
Connector: XLR-female, EMI-suppressed. Pin 1 chassis ground, Pin 2-3 transformer isolated, balanced, and floating. Standard AES3 specified balanced 110 ohm input impedance.

External Sync Range:
Automatically accepts sample rates between 32kHz and 96kHz.

Connector: XLR-female, EMI-suppressed. Pin 1 chassis ground, pins 2 and 3 transformer isolated, balanced, and floating – AES3 standard 110 ohm impedance.

Remote Control: **(**not yet available) Via Ethernet or built-in Wi-Fi. TCP/IP control via built-in Java (TM) based remote control program integrated into web page interface. All software is served from the built-in web server to any standard web browser; there is nothing to install on the user's computer. Ports Used: The defaults are TCP Ports 4545 and 4546 (for control and metering data, respectively).

Connectors: Ethernet - Industry standard EMI-suppressed RJ-45 connector.

GPI Interface: **(**Support not yet available)

Connector: EMI suppressed DB-15 female connector.

Power Requirements: Voltage: 100-250 VAC, 47-63 Hz, Less than VA.

Power Connector: EMI suppressed IEC male.
Detachable 3-wire power cords supplied for US and European use.

Power Supply: Internal. Overvoltage and short circuit protected. Meets EN55022, EN55011 Level B Conducted Emissions. EN61000-4-2, -3, -4, -5, -6 level 3 immunity compliant. Full international safety approval. CE marked.

Environmental: Operating Temperature: 32 to 122 deg. F / 0 to 50 deg. C for all operating voltage ranges. Humidity: 0-95% RH, non-condensing.

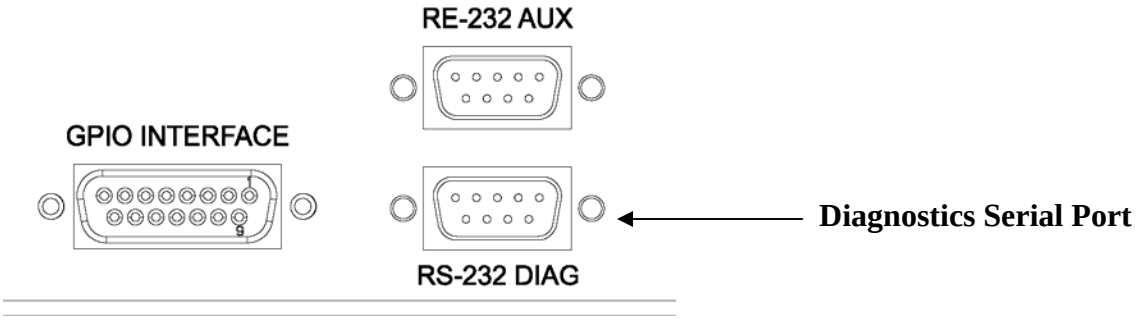
Dimensions: 19" wide x 7” high x 20” deep (48 cm wide x 18 cm high x 51 cm deep) including connectors. Unit requires four EIA rack spaces for mounting.

Shipping Weight: 36 lbs. / 16.3 kg

Telos/Omnia Research and Development is constantly working to improve the quality of our products. Actual specifications are subject to change or improvement without notice.

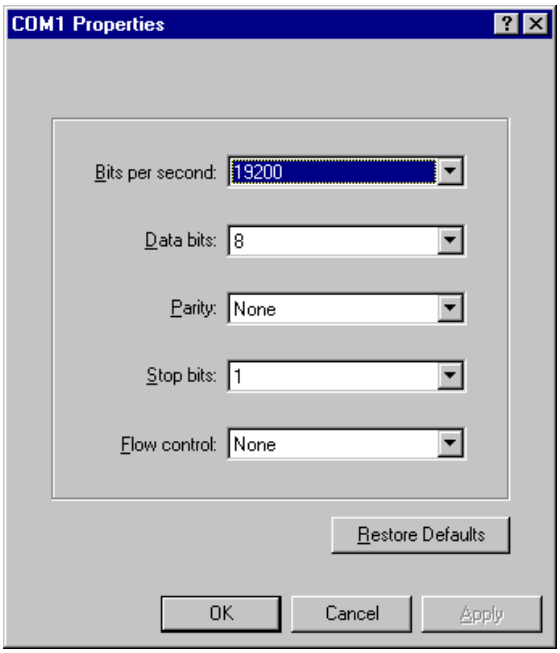
Appendix B: Troubleshooting/Service/Warranty

Operational problems with the Omnia.11 can sometimes be diagnosed using the “RS-232 DIAG” serial port located on the rear panel of the unit and a common terminal communications program. If your computer does not have an RS-232 serial port, a USB to serial RS-232 adaptor can be used.



Detailed information about the Omnia's boot-up progress may be observed at this diagnostics RS-232 port, as well as any error messages that may be encountered. This chapter explains the various boot up and error messages that may be encountered while troubleshooting the unit. We'll cover some basic troubleshooting techniques for isolating possible Omnia.11 problems in the field, and also how to obtain help or repair service from Omnia.

To take complete advantage of this functionality, you only need a standard terminal program for DOS, Windows, or other operating system. It must be configured for a default baud rate of 19200, no hardware handshaking. At Omnia, we commonly use the Hyperterminal© program that ships with some versions of Microsoft Windows©, but you can use whatever program you are familiar with. Please see the example below for how we've set up our connection:



Once these parameters have been entered and saved as a connection profile, they can be used to capture and display (and print) the output of the Omnia.11’s RS-232 serial port during boot up.

Electrical and mechanical safety note!

When the Omnia is operated with its chassis top cover removed, you are exposed to potentially lethal voltages.

Before attempting to make voltage measurements, be forewarned that the power supply heat sinks are connected to the AC power line. Avoid these areas whenever the AC power cable is attached to the Omnia. Never attempt to make measurements when the power supply's safety cover is removed.

When reinstalling the top cover, make certain that all thirty screws are replaced, and that they are tightened to a snug fit. Operating the unit with its cover removed or without all of the retaining screws will void your warranty and may compromise the ability of the Omnia to operate in high RF environments.

Troubleshooting FAQ

1. The unit is totally dead. What should I check first?

First double-check that the unit is receiving AC Line power. Check the line cord and its connection at both ends. Is the line cord plugged into an outlet that has AC power? Are the blue "11" and the ring around the jog wheel illuminated? If the unit has power but no audio, is there an audio input level showing? Is there an audio output level? Is there a power indication? Is the LCD screen blank, scrambled, or not illuminated? Symptoms like these might indicate a power supply problem. If you wish to examine the power supply, be aware that it is *switching* type, and therefore requires a load in order to start up and operate properly. Voltages measured when the power supply is not connected to the Omnia's circuitry may not be correct.

2. The unit has power, but there is no audio output although the processing bargraphs are working. What should I check?

The first thing to verify is normal front panel jog-wheel operation. Verification of front panel operation helps narrow down where the problem is. Look at the metering display. If there is input audio but no output audio indications, try removing power from the unit, waiting 20-30 seconds, then restoring power. If that doesn't bring the operation back to normal, then a hardware failure of some sort may have occurred. If you get output levels but have no output audio, verify that the outputs are connected correctly. An analog output connected to a digital device, or a digital output connected to an analog device won't pass audio! Connect the appropriate test generator to the output cables to verify analog/digital audio is making it to the next device.

The next condition to check is to see if the failure has caused the processing to cease. Using program material, check to see if the processing bargraphs are operating. If they are, then it's a good indication that the system's host processor is working.

At this point, it would be a good idea to see if the loss of audio is confined to only one output port, e.g. the discrete left/right outputs one or both of the composite MPX outputs or the digital AES/EBU or Livewire outputs. Check the signal at each of these locations. If one of the output sections is not operating, then it can be localized to that specific section.

Note: The discrete left/right outputs are operated from their own specialized Digital to Analog converters. Therefore, it's possible for one type of output to fail without affecting the other. Likewise, a failure in the AES/EBU driver section could result in the digital output being dead, while the rest of the system is operational.

3. If my unit fails to boot up normally, can I try the compact flash software card (CF card) from another Omnia.11 that is booting normally?

No. What is actually happening is that the processor board must be tied to the I/O board's MAC address so that it can give the I/O board an IP address using dhcp.

If we did not tie them together, and there were multiple O11's on a network, the I/O board could get addresses from the wrong units and nothing would work.

Also, the O11 could start handing out IP addresses to other devices on the network.

To exchange presets or IO configs between units, the web interface can be used for upload and download.

If you need a new card for a unit, it needs to contain a "firstboot" image (this requires the Ethernet cable to be unplugged for one boot while the processor board acquires the I/O board's MAC automatically).

An existing card can be reset to the firstboot state by issuing the command reset_firstboot in an ssh session

Please contact Omnia Support for assistance.

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Obtaining Service

- Before contacting Omnia Customer Support, please have the serial number of the unit (located on a small barcode sticker on the rear panel in this format: 0279xyyyy) and a description of the symptoms/problems ready for the technician.
- All units being returned to for service MUST have a Return Authorization (RA) number assigned to them first. Units that are returned without a RA number will experience delays in service.
- Return the Omnia in its original shipping carton if possible. For best treatment, shipping the Omnia in its original factory box protects it as well as possible. Damage caused by improper packaging is not covered under your warranty!

Note: To ensure prompt service, the Return Authorization (RA) number must be written prominently on or near the shipping label on the box!

Via the World Wide Web

The Omnia Web site has a wide variety of information that may be useful for product support, applications information, software updates, etc. The URL is: http://www.omniaaudio.com/

Via E-Mail

The customer service e-mail address for Omnia is: **support@omniaaudio.com**.

Via Phone

Customer Support personnel are available in the Cleveland, Ohio, USA office Monday through Friday by phone at +1.216.241.7225 or via email between 9:00 A.M. and 5:00 P.M., Eastern Time.

After hours support is available 24/7 by phone at +1.216.622.0247 or via email.

If you are outside the U.S.A. and non-English speaking, please contact the dealer you purchased your Omnia from first.

Shipping Information: * Telos / Omnia

1241 Superior Avenue East

Cleveland, Ohio 44114 USA

ATTN: To the RA number obtained from Omnia Customer Service

Note: To ensure prompt service, the Return Authorization number must be written prominently on or near the shipping label on the box.

Warranty

This Warranty covers "the Products," which are defined as the various audio equipment, parts, software and accessories manufactured, sold and/or distributed by TLS Corp., d/b/a Omnia (hereinafter "Omnia").

With the exception of software-only items, the Products are warranted to be free from defects in material and workmanship for a period of two years from the date of receipt by the end-user.

Software-only items are warranted to be free from defects in material and workmanship for a period of 90 days from the date of receipt by the end-user.

This warranty is void if the Products are subject to Acts of God, including (without limitation) lightning; improper installation or misuse, including (without limitation) the failure to use telephone and power line surge protection devices; accident; neglect or other damage.

EXCEPT FOR THE ABOVE-STATED WARRANTY, OMNIA MAKES NO WARRANTIES, EXPRESS OR IMPLIED (INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE).

In no event will Omnia, its employees, agents or authorized dealers be liable for incidental or consequential damages, or for loss, damage, or expense directly or indirectly arising from the use of any of the Products or the inability of the end-user to use any of the Products either separately or in combination with other equipment or materials, or from any other cause.

In order to invoke this Warranty, Omnia must receive notice of a warranty claim within the above-stated warranty period and Omnia must authorize warranty coverage. If Omnia authorizes the performance of warranty service, the defective Product must be delivered, shipping prepaid, to: Omnia, 1241 Superior Avenue East, Cleveland, Ohio 44114.

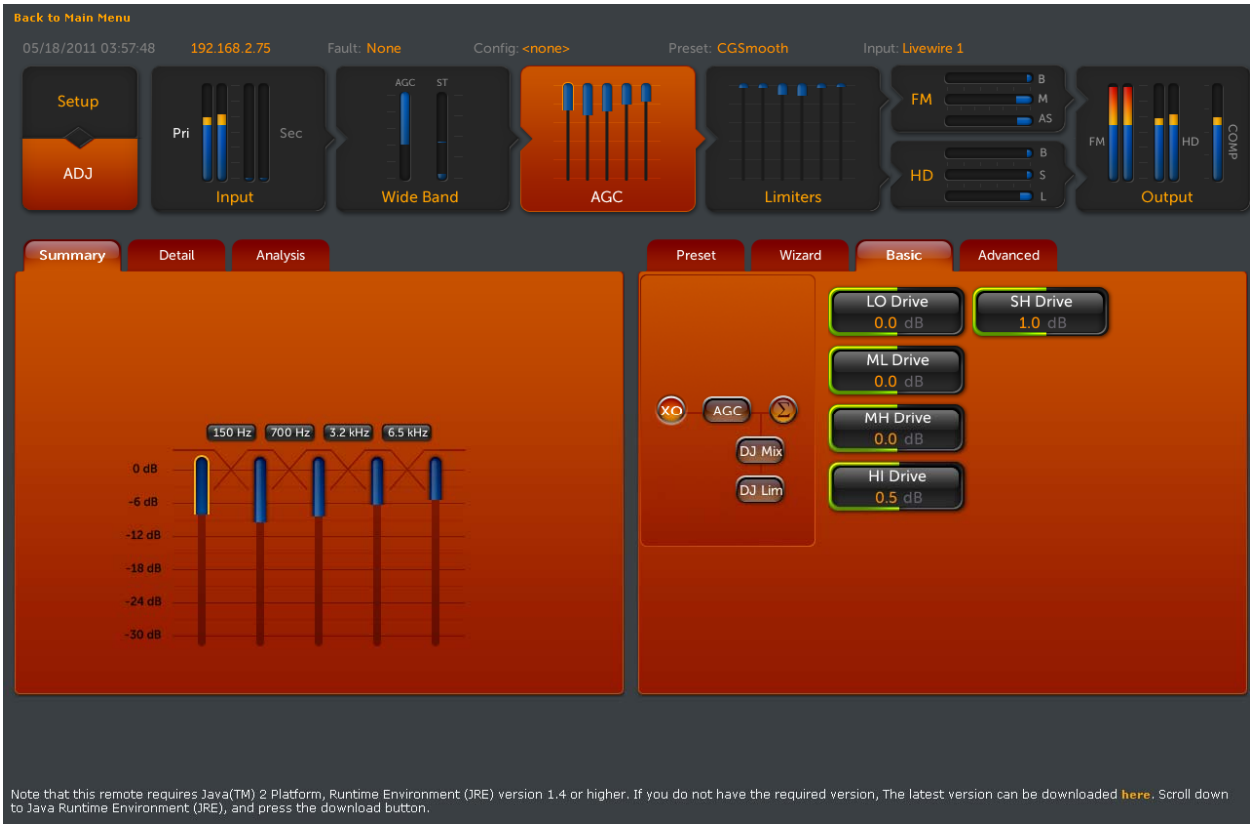
Omnia, at its option will either repair or replace the Products and such action shall be the full extent of Omnia's obligation under this Warranty. After the Products are repaired or replaced Omnia will return them to the party that sent the Products, and Omnia will pay for the cost of shipping.

Omnia's authorized dealers are not authorized to assume for Omnia any additional obligations or liabilities in connection with the dealers' sale of the Products.

Omnia products are to be used with registered protective interface devices that satisfy regulatory requirements in their country of use.

Appendix C: Remote Control and Software Update Procedure

Remote Control



The above screenshot shows the Processing screen of the Omnia.11's built-in remote control applet. This is a Java applet that requires the Java Runtime Environment (JRE) from Sun Microsystems, version 1.4 or higher, to be installed on your computer. Once JRE is installed, the Remote Control applet is accessed through the Omnia.11's built-in web page interface via TCP/IP using any standard Web browser that supports Java.

The latest version of JRE (for Windows, Solaris, Linux and Apple Mac OS) is available here:

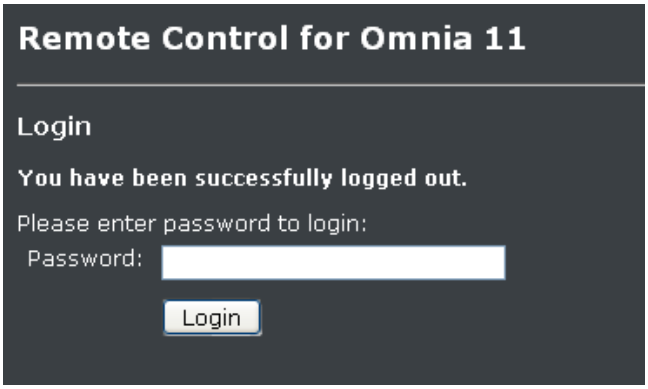
http://www.java.com/en/download/manual.jsp

Note: The remote uses the following network ports that will need to be opened/forwarded through any routers that may be present in the network: The normal http port 80, port 93, port 4545 & port 4546.

Once Java is installed on your computer, using a Web browser, connect to the IP address of your Omnia.11 as follows: (see Setup on Page if you need to enter the network parameters into the Omnia.11)

1. Open a standard Web Browser on your computer and connect to the Omnia.11 by entering: http://xxx.xxx.x.xxx/ in the browser's address bar where the x's in the example above are replaced with the Omnia.11's IP address. Once connected you should see the Login screen:

2. Enter the Password (the default is "**omnia**" – all lower case) and click on the "**Login**" button. (Or simply press "Enter")



The following screen should appear:

There are 5 buttons across the top menu bar and 4 of those 5 are duplicated below in the Main Menu.

The top menu bar will remain visible when in the **File Transfer** and **About** screens.

You can select **Metering & Remote Control (Remote)** to open the processing screen Java applet, **File Transfer** to save & load processing and I/O configuration presets to & from your computer, **About** to view system and support information and **Logout** to logout and return to the login screen.

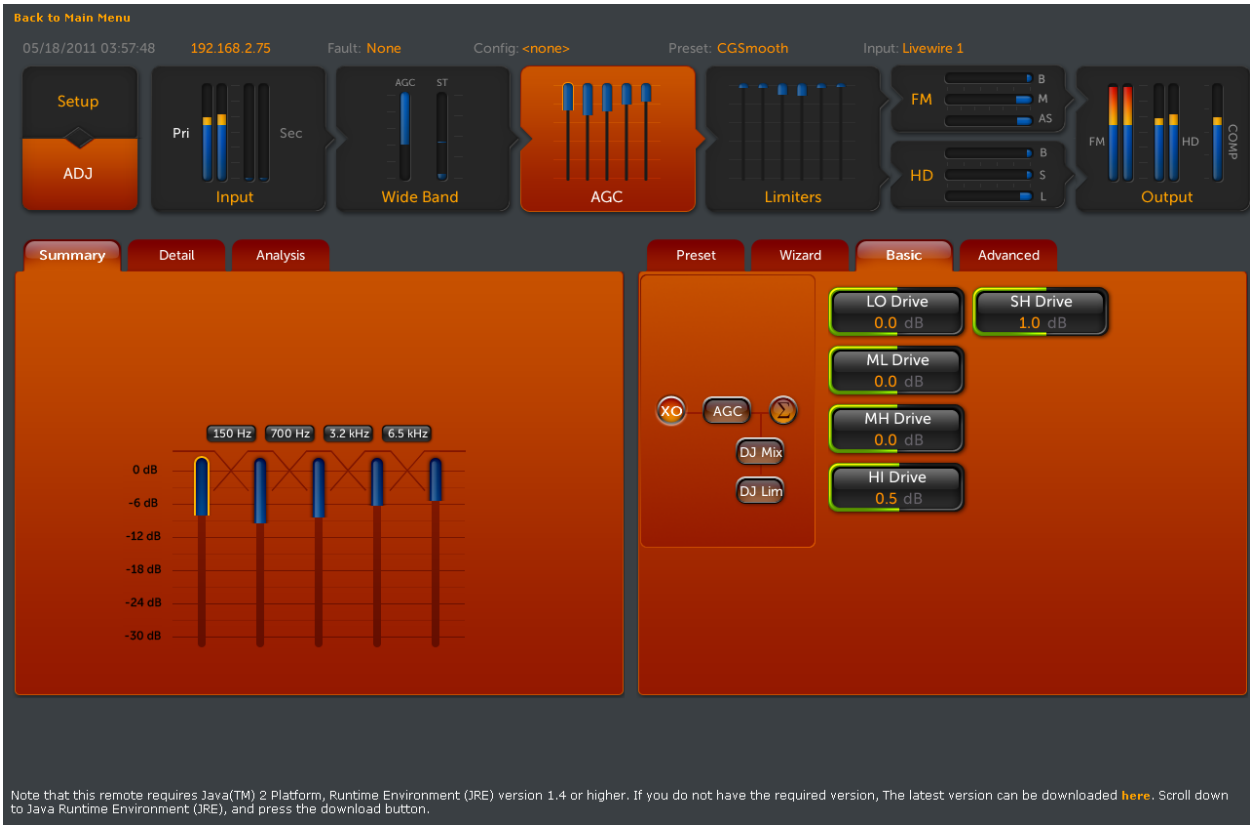
The **Main Menu** button in the top menu bar is used to get back to this screen from the **File Transfer** and **About** screens.

NOTE: After a few minutes of use, and only when attempting to switch to another screen or menu, you may be asked to re-enter the password (as a security measure) before the remote app switches to your selection.

Remote

Click on the "**Remote**" link option from the top menu or "**Meters & remote control**" from the Main Menu.

You may see the Java logo and then the main Remote Control screen should appear:



Note: The remote uses the following network ports that will need to be opened/forwarded through any routers that may be present in the network: The normal http port 80, port 93, port 4545 & port 4546.

At the top-left there is a clickable link: **Back to Main Menu** that is used to exit from this remote control screen to the remote's main menu.

At the bottom there is a reminder that Java Runtime Environment must be installed on your computer in order to see the remote metering and control screen. This reminder will be all you see if Java is not properly installed on your computer.

If audio is present on the inputs, you should see the meters moving along with the audio. A small amount of flickering is normal as the meter information is updated but if it is excessive or the meters are not moving smoothly, check your network connection and/or update your video card drivers or settings.

If you are connecting from behind a router / firewall, be sure to forward the TCP ports used for the control and metering data to the Omnia's local IP address.

The factory defaults are Ports 4545 & 4546, respectively.

Of note here is that the Java remote screen looks exactly like the front panel of the unit and works similarly, with some exceptions and additions, except for the lack of a touch screen interface.

Instead, the mouse is used to select buttons and controls and the Up & Down arrows on your computer's keyboard are used to adjust controls. The mouse wheel (on mice so equipped) can also be used to adjust the controls.

To select a control to adjust, first click on the desired Icon Button at the top of the screen and then click on a desired Tab or button if needed and finally on an adjustment control. It will then highlight in a brighter orange color indicating it is ready for adjustment with either the mouse wheel or arrow keys.

Please note that on smaller monitors or laptops you may not be able to see the entire screen at once. If that is the case, scroll bars will appear to the right and at the bottom of the screen. This is normal.

Virtually everything you can do from the front panel, you can also do with the remote except for Network setup and the Backlight & Calibrate controls in the System setup menu that are specific to the front panel's touch screen.

Your computer's keyboard can be used to enter text whenever the on-screen keyboard pops up.

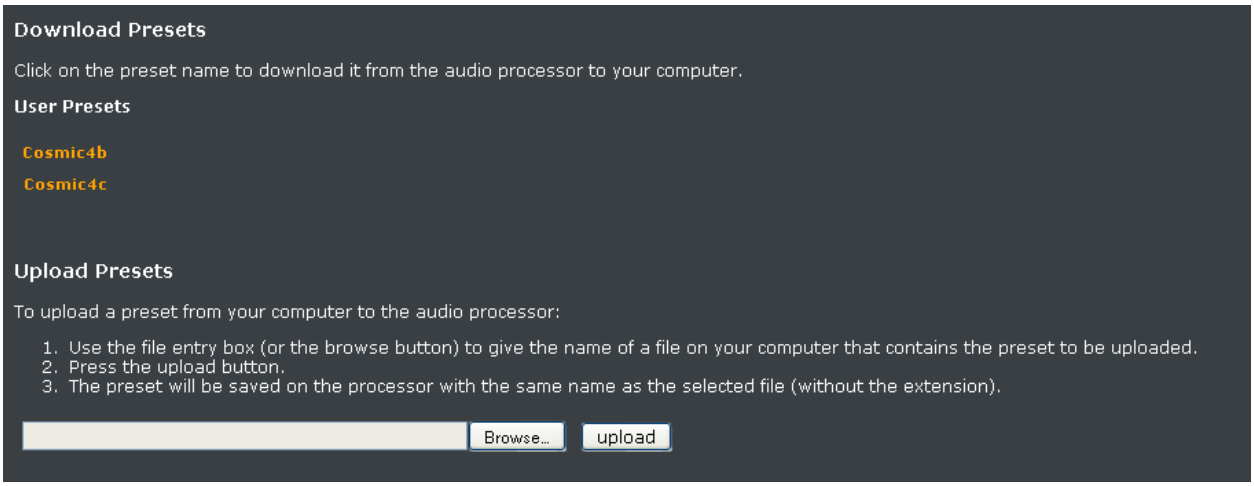
File Transfer

The File Transfer menu allows you to save and load User Presets and I/O Configurations to and from your computer.

From the top menu in the Remote screen, click "File Transfer" or from the Main Menu, click the "User file transfer" option.

Preset File Transfer

Shown below is the top half of the File Transfer screen, which is used for saving and loading user processing presets to and from your computer.


Download Presets
Click on the preset name to download it from the audio processor to your computer.
User Presets
Cosmic4b
Cosmic4c
Upload Presets
To upload a preset from your computer to the audio processor:
1. Use the file entry box (or the browse button) to give the name of a file on your computer that contains the preset to be uploaded.
2. Press the upload button.
3. The preset will be saved on the processor with the same name as the selected file (without the extension).
Browse...
upload

Any user presets on the Omnia.11 will show up as buttons under **User Presets** in the **Download Presets** section. 2 user presets are shown in the example screenshot above.

NOTE: The factory presets will not show up here and cannot be downloaded to your computer.
To download and save a user preset to your computer, simply click on a preset name and your browser's "File Download" box should pop up.

Click the "**Save**" button; choose the desired folder to save the preset in from the "**Save As**" dialog (this may vary with the OS) and click "**Save**" to save the file or "**Cancel**" to abort.

Presets are saved as small, text-based files with the ".opr" extension.

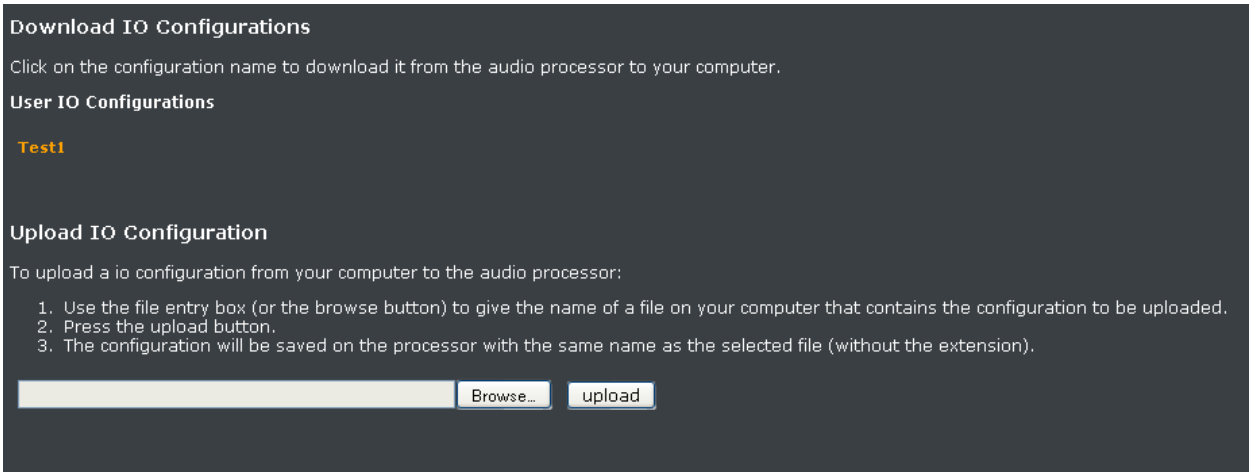
To upload a previously saved user preset to the Omnia.11, use the file entry box (or the browse button) to enter the path to the preset file name to be uploaded and press the "**Upload**" button.

The preset will be saved to the Omnia.11 with the same name as the selected file, minus the .opr extension. Note that uploaded presets will be placed in the Omnia.11's preset list but will not go directly on the air.

I/O Configuration File Transfer

Similarly, I/O configurations can be saved to or loaded from your computer.

Shown below is the bottom half of the "File Transfer" screen, which is used for saving and loading I/O configurations to and from your computer.


Download IO Configurations
Click on the configuration name to download it from the audio processor to your computer.
User IO Configurations
Test1
Upload IO Configuration
To upload a io configuration from your computer to the audio processor:
1. Use the file entry box (or the browse button) to give the name of a file on your computer that contains the configuration to be uploaded.
2. Press the upload button.
3. The configuration will be saved on the processor with the same name as the selected file (without the extension).
Browse...
upload

I/O Configuration download and upload operations work similarly to the Preset download and upload operations described above with the exception that the filename extension for I/O configurations is ".oic".

Software Update Procedure

Software updates for the Omnia.11 are currently performed by swapping out the unit's internal compact flash software card with a new one provided by Omnia Support.

The compact flash card is located inside the top cover of the unit and that top cover must be removed to access it.

Full, illustrated instructions are provided with the update.

A future free software update will allow updates going forward to be performed over the Ethernet remote control connection using an update file downloaded from the Omnia website.

We apologize for any inconvenience this may cause in the meantime and sincerely Thank You for your patience as new features are developed and incorporated into the Omnia.11.

Best Regards,

Team Omnia